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AN ANALYTICAL FRAMEWORK FOR ASSESSING FUTURE FORCE STRUCTURE REQUIREMENTS UNDER UNCERTAINTY

THESIS

Michael L. Fredley, Captain, USAF

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THESIS

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Michael L. Fredley, B.S.

Captain, USAF

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Advisor	Col Gregory S. Parnell Operational Sciences	
Reader	Lt Col Jack A. Jackson Operational Sciences	

Preface

The purpose of this study was to develop an analytical framework for assessing future force structure requirements under uncertainty. With the end of the Cold War, the U.S. has entered into a new era of defense planning marked by declining defense budgets and uncertainty about the future. The analytical models used during the Cold War to address future force structure questions now seem inadequate for dealing with the uncertainty inherent in today's questions. The framework developed during this research provides one approach to answering these questions.

While the framework presented in this thesis has not yet stood the test of time, it has already provided some useful force-structuring insights, particularly about the need to maintain a healthy defense-industrial base. The framework was designed with flexibility in mind. With this flexibility, there is plenty of room for additional experimentation with the framework as it now stands and for future improvement.

I would like to thank my faculty advisor, Col Greg Parnell, and reader, Lt Col Jack Jackson, for their help during this effort. I am particularly grateful for their patience during some difficult times. I would also like to thank my family and friends for their constant love and support.

Michael L. Fredley

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Abstract

The objective of this research was to develop an analytical framework to assess future force structure requirements under the major uncertainties inherent in the post-Cold War era. Among the uncertainties are the frequency and nature of future threats to U.S. interests and the cost of maintaining, building, and demobilizing forces. The centerpiece of the methodology is a computer model which simulates the development of threats to U.S. interests and the actions the U.S. takes to protect those interests. From this simulation, the costs and risks associated with different policy alternatives can be estimated. The simulation is set within a broader decision-analysis framework which provides the philosophy for determining the inputs *to* the simulation and for analyzing the output *from* the simulation. The research included an analysis of 24 policy alternatives involving the size of the Base Force, the "safety margin" maintained between the force size and the force requirement, the rate of force buildup, and the rate of force demobilization. The results suggest that the buildup rate is a key factor in lowering the costs of the U.S. military while controlling the risk of being unable to protect U.S. interests.

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I. Introduction

Background.

With the end of the Cold War, the defense strategy of the United States has changed from a focus on the Soviet Union to a focus on regional conflict around the globe. The U.S. no longer faces a well-defined enemy as it did during the Cold War, but threats to U.S. interests still remain. According to The National Security Strategy of the United States: January 1993,

> While we no longer face the single defining threat which dominated our policy, budgets, force structures, and indeed our fears for forty years, multiple threats to our security still remain. Today's challenges are more complex, ambiguous and diffuse than ever before. They are political, economic, and military; unilateral and multilateral; short- and long-term. (White House, 1993:1)

The document further states that,

> Even as the danger of global war recedes, the potential for smaller but still highly destructive conflicts between nations and within nations is growing. We simply do not and cannot know all the challenges that will arise in the future. What we do know is that our citizens and our interests will be challenged again. We must remain strong enough to protect and defend them. (White House, 1993: ii)

The enemy the U.S. will face in the future is of unknown size and capability in an unknown location and at an unknown time. Yet, questions about the structure of the military forces with which the U.S. will meet this enemy must be answered today. During the Cold War, a myriad of analytical models were developed to help mold the size,

composition, and employment strategies of U.S. military forces. Unfortunately, despite their success during the Cold War, these models now seem inadequate for the uncertainties inherent in today's difficult force structuring decisions. What is needed is a fresh approach to address the problem of structuring military forces for the future, because there is one thing that is clear, "... if we are to learn anything from the often tragic history of this century, it is first that the future is uncertain, ..." (White House, 1993: i).

Problem Statement.

U.S. military planners do not have an adequate analytical framework for assessing future force structure requirements under the major uncertainties inherent in today's world environment.

Research Objective.

The objective of this research is to develop an analytical framework to assess future force structure requirements under the major uncertainties of today's world environment.

Research Questions.

The prevailing paradigm for structuring military forces today is to maintain a "Base Force" capable of meeting the vast majority of future threats and then to reconstitute force structure when deemed necessary for larger threats. In view of this paradigm,

- What size should the "Base Force" be to adequately protect U.S. interests while controlling costs?
- As threats develop and force requirements change, what force-size "safety margin" should be maintained to minimize the risk of being unprepared?
- If force reconstitution is necessary, how quickly should forces be built up?

- As threats are reduced, how quickly should forces be returned to their "Base Force" size (i.e., demobilized)?

Scope.

- The analytical framework will not attempt to define the composition of future forces (e.g., the types and numbers of fighter aircraft).
- The framework will address conventional forces only. It is assumed that a sufficient strategic nuclear force is maintained to deter nuclear aggression by other nations.

Summary.

The determination of future force structure requirements is perhaps more difficult now than ever. The end of the Cold War has marked the end of a single, well-defined threat to national interests and inaugurated a period of great uncertainty about how the U.S. should prepare for future threats. Analytical models used during the Cold War to address future force structure questions seem inadequate for the ambiguity inherent in today's questions. The framework developed during this research provides one approach to answering these questions.

II. Literature Review

The literature review which follows provides background material important for understanding the methodology presented in Chapter 3. The literature review is divided into two sections: Problem-Solving Approaches and Future Force Structure Paradigms.

Problem-Solving Approaches.

This section presents an overview of two approaches commonly used to "solve" problems under uncertainty, Decision Analysis and Simulation. The overview includes the concepts and techniques underlying each approach, as well as the strengths and limitations of each approach.

Decision Analysis. Decision-making is the process of choosing from among alternative courses of action. As the number of alternatives grows and as the consequences become more important and/or more uncertain, the decision becomes increasingly difficult. Decision Analysis helps structure these decision problems so that the decision maker can think more systematically about the problem, taking better account of all the alternatives and uncertainties.

The basic decision analysis has four steps.

1. The decision maker identifies the possible courses of action.

2. The decision maker identifies the uncertain events, or "states of nature," relevant to the decision problem and assigns a probability-of-occurrence to each event. The consequence of any course of action is dependent not only on the course of action but also on the event which actually occurs.

3. The decision maker determines the consequence of each action/event pairing.

4. The decision problem is modeled (in an influence diagram or decision tree, for example) and *solved.* The problem *solution* depends on the expected consequence of each course of action and on the decision maker's risk preferences.

Strengths. The strengths of Decision Analysis include the following:

- The decision maker plays an active role in the decision analysis process. Indeed, the decision maker is central to the process. It is the decision maker's beliefs and values upon which the analysis is built.

- Decision Analysis addresses the uncertainties impinging on the problem in a very systematic way

Weaknesses. Decision Analysis cannot adequately address large problems where there are complex interactions between events over time.

Simulation. As explained by Ravindran,

> Simulation is a numerical technique for conducting experiments on a digital computer, which involves logical and mathematical relationships that interact to describe the behavior and structure of a complex real-world system over extended periods of time. (Ravindran, 1987: 375)

Simulation is often an effective approach to studying a system which cannot be represented mathematically because of the stochastic nature of the problem, the complexity of problem formulation, or the interactions needed to adequately describe the problem under study.

Strengths. Naylor suggests that simulation analysis has the following strengths:

1. Through simulation, one can study the effects of certain information, organizational, and environmental changes on the operations of a system by making alterations in the model of the system and by observing the effects of these alterations on the system's behavior.

2. Simulation of complex systems can yield valuable insight into which variables are more important than the others in the system and how these variables interact.

3. Simulation can be used to experiment with new situations about which we have little or no information, so as to prepare for what may happen.

4. Simulation can serve as a "preservice test" to try out new policies and decision rules for operating a system, before running the risk of experimenting on the real system.

5. For certain type of stochastic problems the sequence of events may be of particular importance. Information about expected values and moments may not be sufficient to describe the process. (Naylor, 1971)

Weaknesses.

- Simulation cannot provide an optimal solution.
- The variability or dispersion of simulation results can be a significant problem and may require long and complex simulation analysis to draw meaningful conclusions (Ravindran, 1987: 377).

Defense Planning Paradigms.

The discussion that follows provides a brief synopsis of the evolution of force planning models over the last few years. The discussion is presented as background to the justification of the model developed in Chapter 3.

The Cold-War Paradigm. The approach the U.S. took to force-planning during the Cold War was based on five principles:

- Overall force structure was based and justified in terms of the most stressing identifiable threat scenarios.
- The analytic "requirements" for total force structure were derived for important, credible, defensively oriented, high-minded, and affordable military objectives--notably, deterring aggression against our allies and other pivotal nations.
- Since the nuclear deterrent was the paramount instrument for avoiding general war with the Soviet Union, certain cost-cutting risks were accepted in defining the "requirements" for conventional ground and air forces.

- Having sized overall structure largely in terms of the most stressing threat, the original idea was then to "fill in" by acquiring specialized capabilities that might be needed for other scenarios, and to establish a strategic reserve suitable for varied contingencies worldwide along with adequate strategic mobility forces.

- Given a defense program consistent with the overall force structure justified in this way, the Secretary of Defense then charges the military services, the Joint Chiefs of Staff, and the various CINCs with preparing operationally not only for the principal threat scenarios but also for a wide range of smaller contingencies. (Davis: 1994: 17)

The Aspin Paradigm. In January 1992, Les Aspin, then Chairman of the House Armed Services Committee, opened up the debate on post-Cold War force structuring when he proposed a threat-based model for force planning. Aspin's model was a modified version of the Cold War paradigm, where he replaced the old Cold War threats with new ones. Aspin uses "Iraq equivalents" to specify possible threats and "Desert Storm equivalents" to specify U.S. force requirements (Winnefeld, 1992: 1). Aspin's model gives little emphasis to the uncertainty of the future, using the recent past as an indication of things to come.

The Cheney Paradigm. Shortly after Chairman Aspin proposed his threat-based model for force planning, Dick Cheney, then Secretary of Defense, presented a capabilities-based model based on the fact that we cannot predict the future with certainty. He argued that "the future environment is defined more by the unknown and the uncertain than by specific threats (Winnefeld, 1992: 1)." Cheney's model suggests a force structure capable of confronting as-yet unclear threats, and seeks to maintain a force prepared to confront any threat.

Current Strategic Policy. Out of the debate over post-Cold War force structuring has come the concept of maintaining a Base Force capable of meeting most threats to U.S.

interests, while guarding the capability to add force when necessary. Additionally, the U.S. had adopted the following strategic policy, as presented in The National Security Strategy of the United States, January 1993. (White House, 1993: 14)

The fundamental elements for our national defense strategy are:

- Strategic Deterrence and Defense. Deterring nuclear attack remains our top priority...

- Forward Presence. While reducing our forward-deployed forces, we are redefining our presence abroad with combined exercises, new access and storage agreements, security and humanitarian assistance, port visits, military-to-military contacts, and periodic and rotational deployments.

- Crisis Response. We must maintain an adequate capability to project power in response to crises should our efforts to deter conflict fail. The precise nature of our response to a crisis will, of course, depend on the interests at stake, our commitments to the nations involved, the level and sophistication of the threat, and on the capabilities of U.S. and allied forces.

- Reconstitution. As we reduce the size of our military forces in response to the demise of the global threat, we must ensure that we continue to deter potential adversaries from militarizing and , if deterrence fails, retain the capability to recreate a global warfighting capability. This "reconstitution" capability involves forming, training, and fielding new fighting units from cadres; mobilizing previously trained or new manpower; and activating the industrial base on a large scale.

III. Methodology

The previous chapter gave a brief description of Decision Analysis and Simulation. The methodology described in this chapter incorporates principles of both approaches, allowing strengths of both approaches to be exploited.

The centerpiece of the methodology is a model which simulates the development of threats to U.S. interests and the actions the U.S. takes to protect those interests. The consequences of the actions, in the form of costs and risks, are dependent on the actions themselves and on the "state of the world" at the time of action.

The simulation model is set within a broader decision-analysis framework. While the simulation model is the "workhorse" of the methodology, the decision-analysis framework provides the "philosophical" basis for the methodology. The relationship between the decision-analysis framework and the simulation model will become clear in the sections which follow.

Definitions.

Before the methodology is presented in detail, it will be helpful to understand the following terms:

- **National Interest**: National Security Strategy of the United States delineates current U.S. national interests (White House, 1993:3). The U.S. protects its national interests through political, economic, and military means. In this analysis, we limit our attention to interests the U.S. chooses to protect through military action.

- **Value of National Interest**: Every U.S. interest has some intrinsic value. In the methodology presented here, the value of a national interest is rated on a utility scale, where "0" represents an interest with no value and "10" represents an interest with the highest value.

- **Threat**: A threat consists of any danger to or risk of losing a national interest. Threats may come from individuals, nations, coalitions, natural disasters, famine, etc. Again, the model only considers those threats against which military forces are employed.

- **Threat Level**: This is the actual amount of U.S. military force required to oppose the threat and protect the interest.

- **Military Action**: "Military action" is used to refer to the action taken to protect the interest threatened. The action may be warfare, deterrence, peacekeeping, environment-shaping, humanitarian relief, etc. The model differentiates between warfare and non-combat actions (deterrence, peacekeeping, humanitarian relief, etc.) but does not attempt to differentiate between types of non-combat actions. The primary difference between warfare and non-combat actions is that force attrition occurs during warfare.

- **Total Force Requirement**: This is the level of military force that the U.S. determines it needs at any given time. Since there may be more than one threat at any time, the Total Force Requirement is a function of the level of each threat. Additionally, the total force requirement may have a "safety margin" built into it, implying that the total force requirement will exceed the level of force actually required for military action.

- **Buildup Level**: This is a percentage used in the calculation of the Total Force Requirement. It is used primarily to provide a force "safety margin."

- **Total Force Level**: This defines the actual amount of U.S. military force at any given time.

- **Base Force**: This is the initial U.S. force level and the minimum force level used in the model.

- **Early Warning Indicators (EWI)**: EWI are any signs the U.S. receives which suggest that an interest will be threatened.

- **EWI Time**: This is the time at which the U.S. has gathered enough EWI to decide to oppose the threat by committing military forces. In practice, the U.S. may have become aware of the threat at an earlier date and may already be using non-military means to mitigate the threat. As used in this model, however, "EWI Time" specifically identifies the time when the U.S. decides that military forces are required, estimates the threat level, and begins action to reconstitute military forces if necessary.

- **Time from EWI to Start**: This is the period of time the U.S. has to prepare for an impending commitment of military forces. The key to preparation is the reconstitution or buildup of military force if the current total force level is less than the estimated force requirement.

- **Start Time of Military Action**: This is the time that military forces are actually committed to oppose the threat and the military action commences. If the event is warfare, attrition of forces begins.

- **Duration of Military Action**: This is the length of time required to protect the interest (i.e., prevail against the threat) if the U.S. is able to commit enough forces to equal the threat level.

- **Major Regional Conflict**: The Major Regional Conflict (MRC) is the primary force building-block used in the methodology. If Desert Storm is used as the measure of the force required for an MRC, then an MRC-sized force consists of 4-5 Army divisions, 4-5 Marine Expeditionary Brigades (MEBs), 10 Air Force tactical fighter wings (TFWs), 100 Air Force heavy bombers, 4-5 Navy carrier battle groups (CVBGs), and special operations forces (SOF) (Davis, 1994: 32).

- **Lesser Regional Conflict**: The Lesser Regional Conflict (LRC) involves two Army light divisions, one MEB, 1-2 CVBGs, 1-2 TFWs, and SOF.

- **World War**: In the methodology presented, a World War (WW) is equal, in size, to 4-6 MRCs.

- **Cold War**: For the methodology presented, a Cold War (CW) is equal, in size, to 2-3 MRCs. However, only a portion of forces are actually committed to military action (deterrence).

- **Policy Alternative**: If there is more than a single decision to be made in an analysis, then a policy alternative is comprised of one possible decision choice from each decision.

- **Lose Threshold**: If the amount of force committed to a threat drops below the "Lose Threshold," the U.S. will lose the interest at stake.

The Decision-Analysis Framework.

The decision-analysis framework is built upon three fundamentals of decision analysis. First, the decision maker (DM) must choose from a number of different policy alternatives. In the future force structure problem, the decision maker must make decisions about the size of the military's base force, the level to which forces are built up in response to increased force requirements, the rate at which forces are built up, and the rate at which forces are demobilized when the force requirements are reduced.

Second, the consequence of any policy choice is dependent on the choice made and the outcome of uncertain events or "states of nature." The uncertainties relevant to the future force structure problem include:

- Frequency of threats.
- Size and nature of threats.
- Value of interests at stake.
- Accuracy of intelligence estimates.
- Time from EWI to military action.
- Types of military action.
- Duration of military actions.
- Force attrition rates.
- Cost to maintain force levels.
- Cost to reconstitute force.
- Cost to demobilize force.

- Size of force required to "hold off" a threat until sufficient forces are available to win.

Third, the decision maker makes judgements about the uncertain events and values impacting the choice of alternatives which must be considered in the analysis. In the future force structure problem the decision maker must be able to make tradeoffs between the costs of military forces, the value of interests lost when forces are unavailable, and the risks of having insufficient forces.

Where Decision Analysis falls short, vis-à-vis the future force structure problem, is in problem solution. The problem is so large and the interactions between events over time so complex that an appeal to influence diagrams and decision trees for problem solution is impractical. For this reason, computer simulation is used to model the problem and estimate the costs and risks associated with each alternative, and Decision-Analysis is used to synthesize these results into a form understandable to the decision maker.

Figure 3-1 depicts the Decision Analysis framework for the force structure problem. Notice that the left-hand side of the framework (the decisions) and the right-hand side of the framework (the consequences) are similar to the respective sides of an influence diagram. The uncertainties are modeled in the simulation.

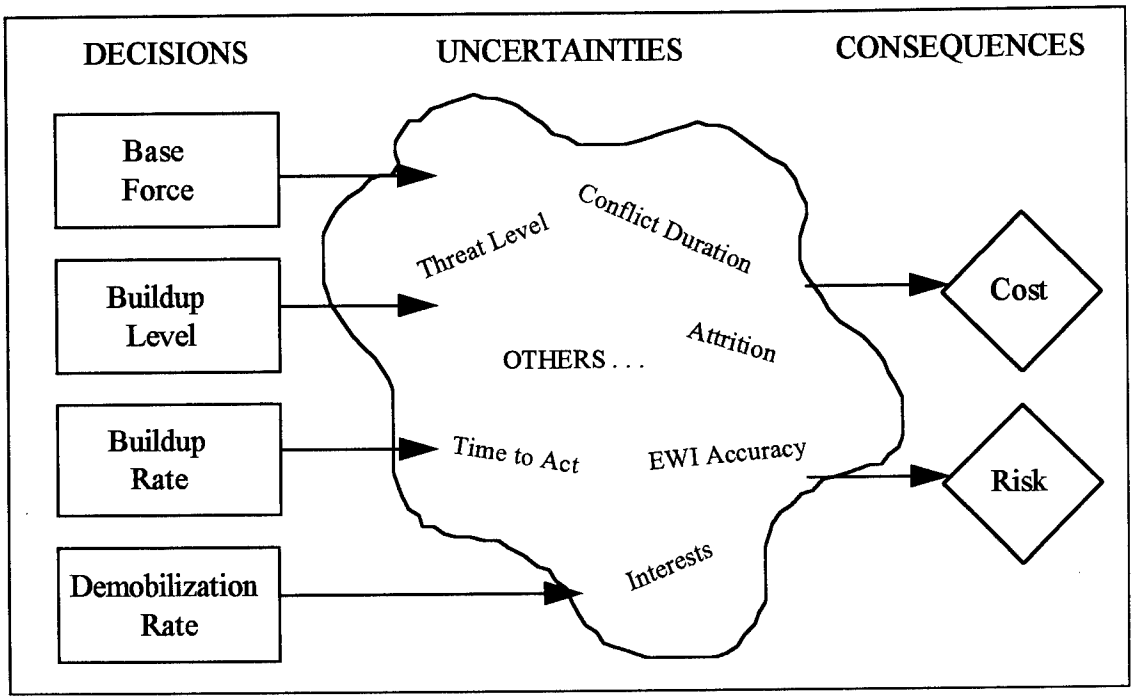

Figure 3-1. Decision Analysis Framework

The Simulation - In General.

The simulation models the occurrence of threats to U.S. interests and the actions the U.S. takes in response. The flowchart in Figure 3-2 gives a representation of how this interaction might take place in the "real world." The simulation is designed to incorporate aspects of the force structure paradigms presented in Chapter 2. For example, it appears that the U.S. is becoming more involved in "environment-shaping." "Environment-shaping" might include peacekeeping efforts or humanitarian relief to provide stability in a trouble region or to encourage goodwill towards the U.S. Since the action, at least at the outset, is a non-combat use of the military, the simulation allows the user to generate "peaceful threats" where an interest is still at stake (stability or goodwill), but protection of the interest does not require warfare.

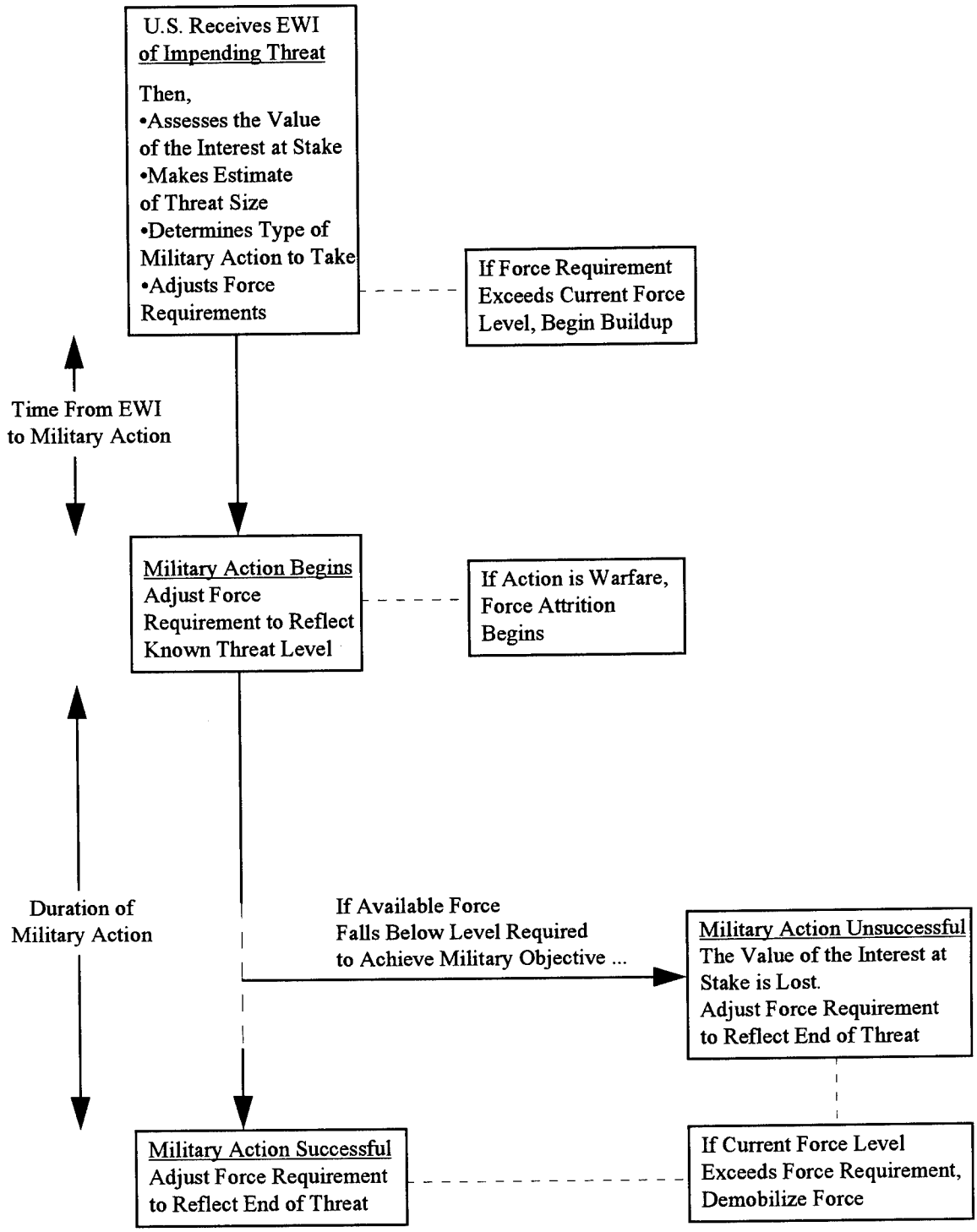

Figure 3-2. Flowchart of "Real-World" Problem

The Simulation - In Detail.

The simulation code is written in the SLAM II programming language and is broken into two parts. The first part is the network code which controls the flow and logic of the simulation. The second part contains the control statements which, among other things, determine the value of input variables and specify the number of runs to make. For a complete description of the SLAM II language, refer to Pritsker (Pritsker, 1986).

The following discussion explains how the simulation network code is constructed to *imitate* the model of the real world previously described. It also specifies when the user may use the control statements to define input parameters. In this way, the user may tailor the model according to his or her judgements about the real world.

Threat Generation. Because the number and timing of real-world threats is unknown, the simulation randomly generates threats according to probabilistic distributions whose parameters are defined by the user. To approximate the variability in the nature and frequency of real-world threats, the simulation is designed to create five different types of threat. These threat types represent MRCs/LRCs, WW, and CW, as summarized in Table 3-1 below. Along with their numeric and symbolic designators, the table lists the primary differentiating characteristic of each threat type.

Table 3-1

Threat Types

Threat Type Numeric Designator	Threat Type Symbolic Designator	Primary Characteristics
1, 2, 3	MRC	Major or Lesser Regional Conflicts Small to medium threat levels. Interests of low to medium value. Military action may involve warfare, deterrence, or environment-shaping.
4	WW	World War Largest threat level. Interest of highest value. Military action involves warfare.
5	CW	Cold War Large threat level. Interest of highest value. Military action involves deterrence. *The actual force committed to military action is only a fraction of the threat level.

* The assumption is that, during Cold War, the U.S. will build up its military forces to a relatively high level. However, only a portion of those forces are placed in an active deterrent posture (e.g., forward-deployed to guard borders). The remainder of the forces may be used to protect against MRC-type threats.

MRC threats are generated with exponentially distributed interarrival times. Because their interarrival times are exponentially distributed, the number of MRC threats generated in any given period of time is a Poisson random variable (Ross, 1993: 214). The Poisson distribution is frequently used to model the number of events to occur in a period of time (Mendenhall, 1990: 117) and so appears to be a reasonable distribution to model the number of threats to develop over the planning horizon of the simulation.

The exponential distribution is defined by one parameter: the mean time between arrivals. For MRC threats, the mean time between arrivals is expressed in years and defined by the user through the SLAM II control statements.

WW and CW threats are considered to be rare. The model is designed to generate at most one WW threat and one CW threat during the simulation. The time at which a WW or CW threat is generated is determined by two user-defined parameters: the earliest time at which the threat can be generated (min) and the probability (p) that the threat is generated within the planning horizon of the simulation. The generation time is then uniformly distributed with lower limit "min" and upper limit "max" defined by the following equation:

$$\max = \min + \frac{\text{horizon} - \min}{p} \tag{1}$$

where "horizon" is the planning horizon of the simulation. The formulation of this equation is best understood by referring to Figure 3-3.

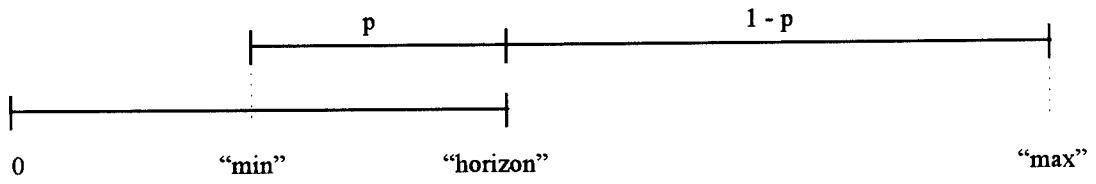

Figure 3-3. Formulating The Distribution of WW and CW Generation.

The probability that a WW or CW threat is generated between the earliest time possible and the end of the simulation is given by

$$p = \frac{\text{horizon} - \text{min}}{\text{max} - \text{min}} \qquad (2)$$

Solving for "max" yields the above equation. Note that the threat is a factor in the simulation only if the number drawn from the distribution is less than the planning horizon of the simulation.

Occasionally, the state of the simulation "world" affects the generation of threats. The states of the "world" which impact the generation of threats (and the impact they have) are enumerated in Table 3-2 below.

Table 3-2

States of the "World" Which Impact Threat Generation

State of the "World"	Impact on Threat Generation	Rationale
EWI of WW received or WW in progress.	No MRC threats generated. No CW threats generated.	Any MRC would become part of WW. CW and WW are mutually exclusive.
WW ends.	CW may develop from WW.	World War II experience. The probability of occurrence is user-defined
CW in progress.	MRC generation rates changed.	To reflect DM judgement about stabilizing effect of Cold War. The change is user-defined.
CW ends.	MRC generation rates returned to initial values.	Any stabilizing effect of Cold War ended.

Assignment of Attributes. Once a threat had been generated, it is given attributes which define important characteristics about the threat and which control the flow of the threat through the simulation. Table 3-3 enumerates these threat attributes. An explanation of how attributes are assigned follows the table.

Table 3-3

Threat Attributes

Attribute	Threat(s) Receiving Attribute
Threat Level	All
Estimate of Threat Level	All
Value of Interest	All
Attrition Rate	MRC, WW
Time from EWI to Start of Military Action	All
Projected Duration of Action	All
Deterrent Force Requirement	CW
Projected Deterrent Force Requirement	CW

- Threat Level: The Threat Level is assigned according to a uniform distribution with parameters "min" and "max." The units of measure for Threat Level are MRC-equivalents. The user may define different parameters for all five threat types.

- Estimate of Threat Level: The Estimate of Threat Level is a function of the Threat Level and the accuracy of intelligence estimates. If, for example, intelligence estimates range from 10% below the Threat Level to 15% above the Threat Level, then the Estimate of Threat Level is uniformly distributed with parameters 0.9*TL and 1.15*TL, where TL = Threat Level. The accuracy of intelligence estimates is user-defined and the user may specify a different accuracy for each threat type.

- Value of Interest: The Value of Interest at stake for WW and CW threats is given as 10. For MRC threats, the Value of Interest is assigned according to a discrete distribution defined by the user in the control statements. The user first chooses three values between 0 and 10. These three values are the possible Values of Interest for MRC threats. Then the user defines the probability that threat type 1 has a Value of Interest equal to each of the three chosen values. The user does the same for threat types 2 and 3.

- Attrition Rate: The user may define a distinct Attrition Rate for MRC and WW threat types. If the threat is probabilistically determined to require non-combat action, the Attrition Rate is zero.

- Time from EWI to Start of Military Action: The Time from EWI to Start of Military Action is sampled from a triangular distribution with user-defined parameters "min," mode," and "max." Pritsker points out that "the triangular distribution is used when a most likely value can be ascertained along with

minimum and maximum values...(Pritsker, 1986: 697)" The distribution appeared reasonable for assigning this time component.

- Projected Duration of Action: The Projected Duration of Action is also sampled from a triangular distribution with user-defined parameters. This attribute defines the length of time required to successfully complete the Military Action if the force assigned to the action is equal to the Threat Level. This value will be different from the actual duration if the level of forces assigned to the action drops below the Threat Level.

- Deterrent Force Requirement: The Deterrent Force Requirement is given to CW threats and defines the amount of force to actually assign to military action. The requirement is simply a user-defined percentage of the Threat Level.

- Projected Deterrent Force Requirement: The Projected Deterrent Force Requirement is similar to the Deterrent Force Requirement but is based on the Estimate of Threat Level rather than the Threat Level. This projected requirement is used in determining force requirements before the CW actually begins.

Determination of Force Requirements. Based on intelligence estimates of the number of forces required to protect its interests against a new threat, the U.S. adjusts its force requirement. The force requirement is dependent on all threats for which the U.S. is either preparing or against which the U.S. is actively engaged. The following table shows which formulas are used to determine the force requirement. The formulas are presented after the table.

Table 3-4

Force Requirement Determination

	Threats Already Present		
Threat Generated	MRC Only	WW	CW
MRC	Formula 1	Not Possible	Formula 3
WW	Formula 2	Not Possible	Formula 2
CW	Formula 3	Not Possible	Not Possible

The force requirement formulas use the following notation:

$$BL = \frac{BuildupLevel(\%)}{100}$$

TL(*threat type*) = Threat Level of the named threat type

DF = Amount of Deterrent Force Required During Cold War

- Formula 1:

$$BL * \sum TL(MRC) \tag{3}$$

  - Example: U.S. forces are already committed to a 1-MRC threat. The Buildup Level is 150%. EWI of a 1-MRC threat are received. The resultant force requirement is 3 MRC-equivalents. This provides a "safety margin" of 50%, or 1-MRC-equivalent.

- Formula 2:

$$BL * \max\left\{TL(WW), \sum TL(MRC)\right\} \tag{4}$$

  - Example: A CW is in progress and the U.S. is preparing for a 1-MRC threat. The Buildup Level is 100%. EWI of a 5-MRC-equivalent WW threat are received. The CW will be "replaced" by the WW and the 1-MRC threat will be absorbed into the WW. The resultant force requirement is 5 MRC-equivalents.

- Formula 3:

$$BL * \max\left\{TL(CW), \sum TL(MRC) + DF\right\} \tag{5}$$

  - Example 1: U.S. forces are already committed to a 1-MRC threat. The Buildup Level is 100%. EWI of a 3-MRC-equivalent CW are received, but only 33% (or DF = 1-MRC-equivalent) will be required for military action. The resultant force requirement is max{3, 1 + 1} = 3 MRC-equivalents.

  - Example 2: If a 2-MRC threat is added to Example 1, the resultant force requirement is max{3, 3 + 1} = 4 MRC-equivalents.

Note: When using the formulas, the actual Threat Level is used for threats against which military action has already begun, while the Estimate of Threat Level is used for threats for which EWI have just been received.

Time Between EWI and Military Action. This is the time between the EWI of a threat and the beginning of military action. If the current force level is below the force requirement, force buildup begins. If force buildup is necessary, this "preparation" time may or may not be sufficient to raise the Total Force level up to the Force Requirement.

Military Action. At the end of the preparation time, the military action begins. The actual threat level becomes known and the force requirement is recalculated as described above. If the Force Requirement exceeds Total Force, then force buildup begins or continues. Table 3-5 lists the additional events which take place at this time.

Table 3-5

Rules for Beginning Military Action

Threat Entering Action	Event
MRC	Available forces are assigned to action. Attrition begins if action is warfare.
WW	Any previous MRCs end. If the sum of those MRCs is greater than the size of the WW, then the size of the WW is adjusted to equal the sum of the MRCs. Available forces are assigned to action. Attrition begins.
CW	Available forces are assigned to deterrence. If forces insufficient and there are any MRCs in action, the CW "preempts" forces from the MRCs.

Involvement in the interest continues until the U.S. attains its objective or has too few forces to continue its pursuit. If force assigned drops below the Threat Level, the duration of the operation will be lengthened, unless the forces drop below the Lose Threshold, in which case the U.S. withdraws and loses the interest at stake.

End of Event. At this point the military action ends (successfully or unsuccessfully) and force requirements are recalculated (as described above) to reflect the end of a threat. If current force levels exceed force requirements, force demobilization begin.

Attrition, Buildup, and Demobilization.

The simulation model has three "subroutines" which handle the attrition, buildup, and demobilization of forces. The subroutines work by simply advancing the simulation clock a short time interval and then either increasing or decreasing the Total Force Level. The user defines the attrition, buildup, and demobilization rates in the control statements.

Attrition. When determining the amount of attrition during a military action, it is assumed that, since attrition is inflicted by the enemy, the attrition *rate* is applied to the Threat Level rather than to the actual amount of forces committed to the military action in question. For example, assume that the Threat Level is 2 MRC-equivalents, the amount of forces committed to the military action is 1.75 MRC-equivalents, the attrition rate is 10% per year, and the "clock" is advanced 0.04 year. Then the amount of attrition over the time interval is

$$2(\text{MRC}) * \frac{10\%}{\text{Year}} * 0.04(\text{Year}) = 0.008(\text{MRC}) \qquad (6)$$

The amount of force committed to the military action is, thus, reduced from 1.75 MRC-equivalents to 1.742 MRC-equivalents over the period of 0.04 year (or approximately 2 weeks). In turn, the Total Force Level is decreased by 0.008 MRC-equivalents.

NOTE: There are other, more sophisticated methods of modeling attrition than that presented here. Substitution of such models in the simulation may be appropriate.

Buildup and Demobilization. The buildup and demobilization of forces works in fashion similar to attrition, but the rates are given in MRC-equivalents per year. Thus, if the Buildup Rate is 0.5 MRC-equivalents per year, then over a two week interval the Total Force Level is increased by 0.002 MRC-equivalents.

Costs.

There are three costs used to track the billions of dollars required to maintain, buildup, and demobilize forces. Each time there's a change in the amount of Total Force, a "maintenance" cost is assessed. If Total Force level "A" began at time 1, for example, and the Total Force changes to level "B" at time 2, then the "maintenance" cost is the cost of maintaining level "A" from time 1 to time 2. The "maintenance" cost for that time period is calculated by multiplying the Total Force Cost Per Year for level "A" by the length of the time period. Then a new Total Force Cost Per Year is determined as follows:

- Before the simulation is started, the user specifies five Total Force levels and their respective costs per year. These five Total Force levels form six intervals.
- The new Total Force level is compared to the user-specified Total Force levels to determine in which interval it falls.
- Through linear interpolation (or extrapolation) the cost of the new Total Force level is determined.
- For example, suppose that the five Total Force levels specified are 0.5, 1, 2, 3, and 4 MRC-equivalents with respective costs, 100, 185, 250, 300, and 325 billion dollars. If the new Total Force level is 2.5 MRC-equivalents, then this new force level falls in the interval (2, 3) and by linear interpolation has a cost of $275 billion per year.

Buildup and demobilization costs are determined by assessing penalties to the change in Total Force Cost Per Year. During any buildup or demobilization of forces, the change

in the Total Force Cost Per Year is multiplied by the time interval and the penalty. For example, if the previous and current Total Force Costs Per Year are $275 billion and $276 billion, respectively, the time interval is 0.04 year, and the Buildup Penalty 20%, then the additional cost of building force over this two-week interval is

$$(\$276 - \$275) * 0.04\text{Year} * 20\% = \$0.008 \quad (7)$$

or $8 million.

Risks.

There are a number of risks important to the choice of policy alternatives. The first risk is the risk of losing valuable U.S. interests. Recall that every U.S. interest has a value defined on a 0 to 10 utility scale. When a military action is lost, so is the value of the interest at stake. Thus, the risk of losing interests is determined by the sum of the values of all the interests lost during the simulation.

The second risk could be thought of as a Duration Penalty. That is, if the amount of forces assigned to a military action is below the Threat Level, then the Duration of Military Action is increased, or penalized. The increase is determined by the shortage in forces, the amount that the "clock" advances, and the Duration Penalty parameter (defined by the user in the control statements). For example, if the Threat Level is 1 MRC-equivalent and the amount of forces assigned to the threat is 0.9 MRC-equivalents, then the shortage is 10%. The shortage is multiplied by the Duration Penalty and the "clock" time interval. So, if the Duration Penalty is 200%, then the Duration of the Military Action will be increased by

$$10\%\text{Shortage} * 200\%\text{Penalty} * 0.04\text{Year} = 0.008\text{Year} \quad (8)$$

or approximately 3 days. In words, if there is a 10% shortage in required forces over a two-week period, the duration of the military action will be increased 3 days. The significance of this penalty is that there will be additional forces lost to attrition beyond what there would have been if sufficient forces were available.

The third risk is the probability that Total Force falls below the Force Requirement. Since the Force Requirement may have a "safety margin" built into it, a risk of even greater importance is the probability that Total Force falls below the amount of force actually required for military action. Both of these risks are reported by the simulation.

The Program Code.

Appendix A includes the program code for the model with a description of how to input parameters and build the control statements.

Parameter Selection.

All the user-defined parameters for the simulation are enumerated in Appendix A. With a few exceptions, the parameters reflect personal judgements formed after a cursory review of post-World War II history, with particular attention to recent events. The few exceptions are explained below.

Buildup Rate. The Buildup Rate is actually one of the decision variables rather than a *static* parameter. It seemed important to set an upper bound on the Buildup Rate for the analysis. Table 3-6 summarizes the number of "units" required for one MRC. Lewis claims that, on the average, 6.5 aircraft must be produced each year to sustain a TFW

(Lewis, 1989: 44). A 2 MRC-equivalent military includes 20 TFW-equivalents. At a rate of 6.5 aircraft per TFW per year, industry must produce 130 aircraft a year to sustain a 2 MRC-equivalent Air Force. If an additional 10 TFWs were to be built in a year (a Buildup Rate of 1 MRC per year), a total of 850 aircraft would need to be built, or approximately 6.5 times the normal rate. This seemed like an attainable Buildup Rate, keeping in mind that the Buildup Cost Penalty should reflect the Buildup Rate. (Unfortunately, data was not available to make a similar claim about Army or Navy units.)

Table 3-6

Composition of One MRC

Military Service	Units	Individual Components
Army	5 Divisions	75,000 Soldiers
Navy	5 Carriers Battle Groups	5 Carriers + Support Ships
Air Force	10 Tactical Fighter Wings	720 Aircraft

Total Force Costs. Considerable historical data on defense expenditures is available (OMB, 1994; Air Force Association, 1994: 37); however, it does not lend itself very easily to an *unarguable* projection of future force costs. Figure 3-4 shows a plot of historical cost data and an approximation of those costs. Data dating back to the mid-1980's was normalized into constant 1995 dollars and, for each year, the force size was converted into MRC-equivalents. The approximating line shown in the figure is defined by the formula

$$\text{Cost(\$billions)} = 132 * \sqrt{2 * \text{MRC}} \qquad (9)$$

The term under the radical was chosen to provide a concave curve which begins at the origin (assuming that \$0 give no capability), rises quickly at first (to reflect the front-end costs of infrastructure), and then increases at a decreasing rate to reflect a decreasing

marginal cost of additional forces. The constant term was chosen to scale the curve upward to "fit" through the historical data.

The five Total Force Levels entered into the control statements were 0.5, 1, 2, 3, and 4, and approximate costs for these levels were determined using the above equation.

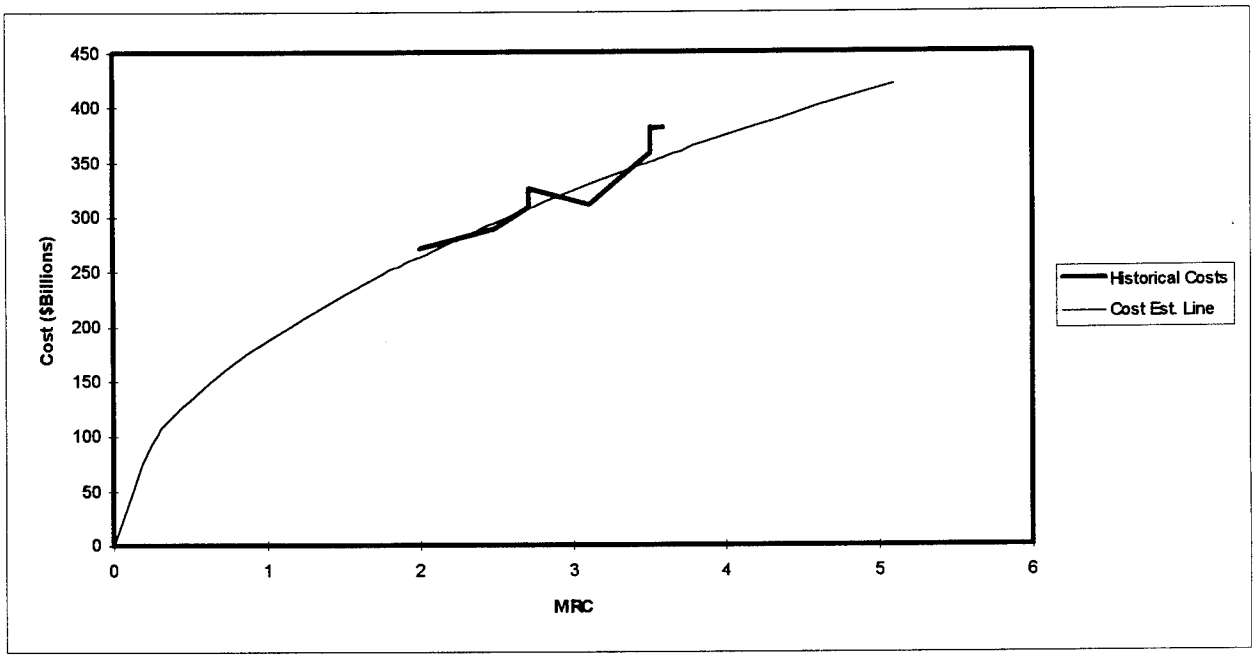

Figure 3-4. Approximating Force Costs

Design of Experiment.

Table 3-7 enumerates the policy alternatives evaluated by the methodology. The levels for each decision variable were chosen as follows:

- Three Base Force levels were chosen. A 3-MRC Base Force (similar in size to Cold War force levels) was evaluated to provide a baseline by which to compare other alternatives. A 2-MRC Base Force was evaluated because it is the current Base Force "of choice." A 1-MRC Base Force was evaluated to investigate the possibility of reducing the Base Force even further.

- Two Buildup Levels were evaluated: 100% of the Force Requirement and 150% of the Force Requirement. These two levels permit comparison of policy alternatives with no "safety margin" and with a 50% "safety margin," respectively.

- Two Buildup Rates were evaluated: 0.2 and 1 MRC per year. A Buildup Rate of 0.2 MRC per year is a relatively low Buildup Rate, while a 1 MRC per year rate is relatively high (as explained earlier).

- Two Demobilization Rates were evaluated: 0.2 and 1 MRC per year. These rates are chosen to compare a relatively low rate with a relatively high rate.

With the given levels of each decision variable, a total of 24 policy alternatives were evaluated. Each alternative was simulated 100 times. In general, more simulation runs means better statistical data. The choice of simulating 100 times per alternative was made primarily according to limitations in processing time.

Table 3-7

Design of Experiment

Alternative	Base Force (MRC)	Buildup Level (%)	Buildup Rate (MRC/Year)	Demobilization Rate (MRC/Year)
1	1	100	1	1
2	1	100	1	0.2
3	1	100	0.2	1
4	1	100	0.2	0.2
5	1	150	1	1
6	1	150	1	0.2
7	1	150	0.2	1
8	1	150	0.2	0.2
9	2	100	1	1
10	2	100	1	0.2
11	2	100	0.2	1
12	2	100	0.2	0.2
13	2	150	1	1
14	2	150	1	0.2
15	2	150	0.2	1
16	2	150	0.2	0.2
17	3	100	1	1
18	3	100	1	0.2
19	3	100	0.2	1
20	3	100	0.2	0.2
21	3	150	1	1
22	3	150	1	0.2
23	3	150	0.2	1
24	3	150	0.2	0.2

IV. Findings

This chapter is divided into three sections. The first section offers an example of a simulation timeline. The second section presents a characterization of the costs and risks associated with each alternative. The third section presents plots useful in evaluating alternatives against the costs and risks.

Example of a Simulation Timeline.

The three plots which follow demonstrate how certain key variables respond over time to simulated events. The plots are from one distinct simulation run of policy Alternative 9 (2-MRC Base Force, 100% Buildup Level, 1 MRC-per-year Buildup Rate, and 1 MRC-per-year Demobilization Rate).

The first plot (Figure 4-1) shows how Total Force and the Force Requirement change over time. Table 4-1 explains the most meaningful "events" in the timeline.

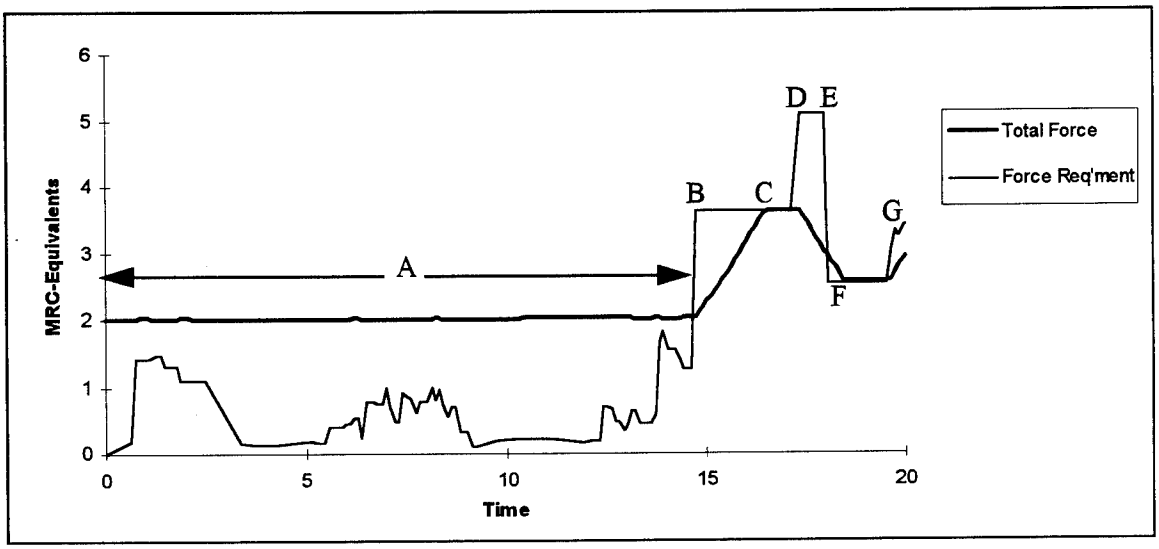

Figure 4-1. Timeline Example (Total Force vs. Force Requirement)

Table 4-1

Key Events in Figure 4-1

Time	"Event"
A	A period of time when various MRC-type threats are generated and acted upon.
B	EWI of a World War are received. The Force Requirement is adjusted upward according to intelligence estimates of the Threat Level of the impending war. Buildup of force begins.
C	The Total Force has reached the Force Requirement and the buildup ends. Recall that with a Buildup Level of 100%, there is no "safety margin."
D	The World War begins and the Force Requirement is adjusted upward to reflect the actual Threat Level. Attrition begins.
E	Force buildup is not able to "keep up" with attrition. Total Force drops below the Lose Threshold and the World War ends unfavorably for the U.S.
F	A Cold War period evolves out of the World War. Forces are demobilized to the new Force Requirement.
G	MRC-type threats begin to developed again.

Figure 4-2 shows two variables: 1) Total Force and 2) Total Force less the Force Requirement. Table 4-2 summarizes the key events in this plot.

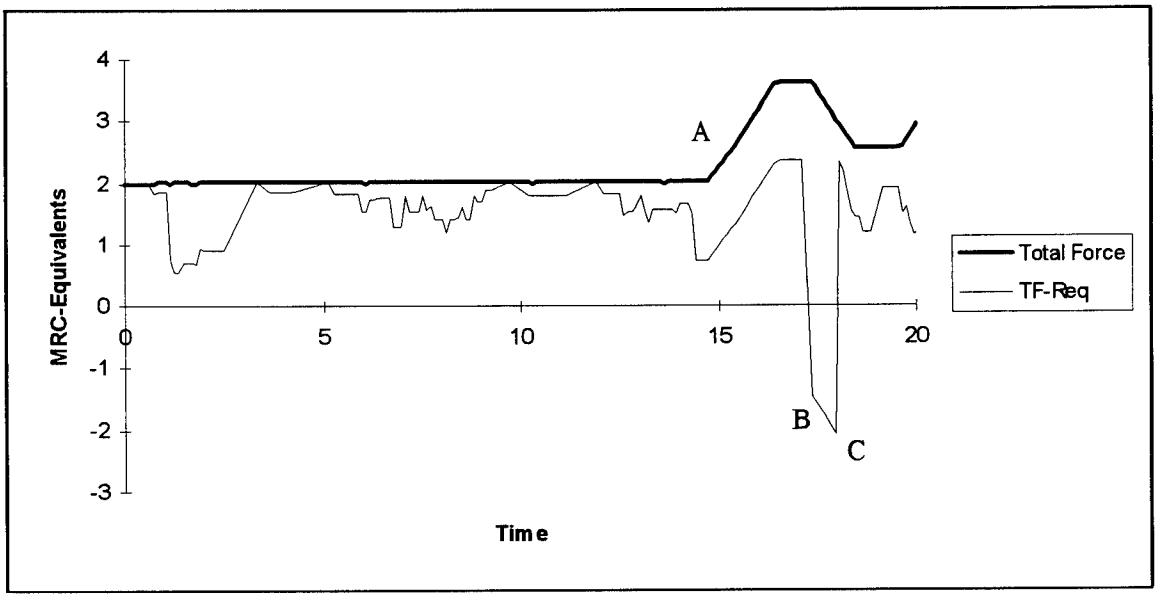

Figure 4-2. Timeline Example (Total Force vs. Total Force less Force Requirement)

Table 4-2

Key Events in Figure 4-2

Time	"Event"
A	Force buildup begins in response to EWI of World War.
B	The World War begins and the difference between Total Force and the Force Requirement drops below zero. In other words, the Force Requirement exceeds Total Force.
C	After a period of attrition, Total Force drops to a level where the Force Requirement exceeds Total Force by the Lose Threshold. The World War ends unfavorably for the U.S.

Figure 4-3 shows Total Force versus the Cost per Year. Point "A" marks the time when military buildup begins.

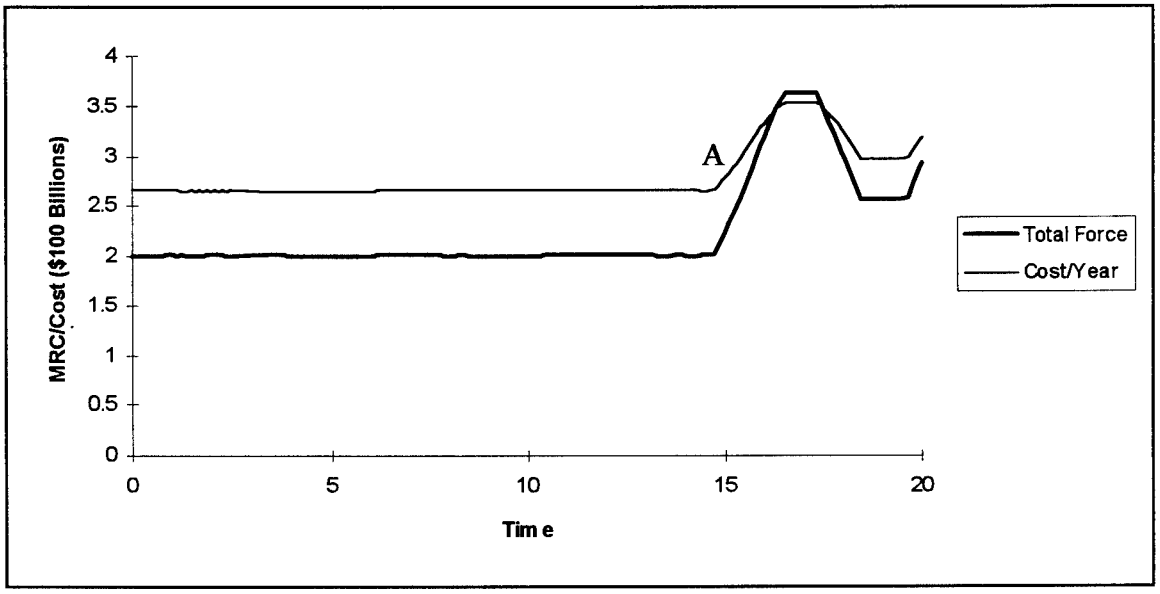

Figure 4-3. Timeline Example (Total Force vs. Cost/Year)

Characterization of Costs and Risks.

Appendix B contains a complete listing of the simulation output for all 24 alternatives. The discussion which follows summarizes this data. Recall that 100 simulation runs were made for each alternative. In the plots below, the mean of these 100 runs is used as the single-point estimator of the "true" value of the variables presented.

Total Cost. Figure 4-4 shows the Total Cost for each policy alternative. When a line is added to connect the points, the following patterns emerge:

- There is a general trend upward from left to right. This trend is explained by the fact that the alternatives to the left have a Base Force of 1 while those to the right have a Base Force of 3.

- There are regular peaks and dips. The peaks are alternatives with the higher Buildup Rate while the dips are the alternatives with the lower Buildup Rate. Obviously, the greater penalty associated with the higher Buildup Rate increases overall cost.

- Within each peak and dip are two alternatives. Both alternatives in any given peak or dip are identical except for the Demobilization Rate. The first alternative in each peak has the higher Demobilization Rate and generally has a slightly lower Total Cost. Since the higher Demobilization Rate was not penalized more than the lower rate, it would make sense to demobilize quickly and return more quickly to a lower maintenance cost.

- There is a greater difference between the peaks and dips to the left than between the peaks and dips to the right. This might suggest (and reasonably so) that, with a larger Base Force, there is less reliance on buildup and demobilization.

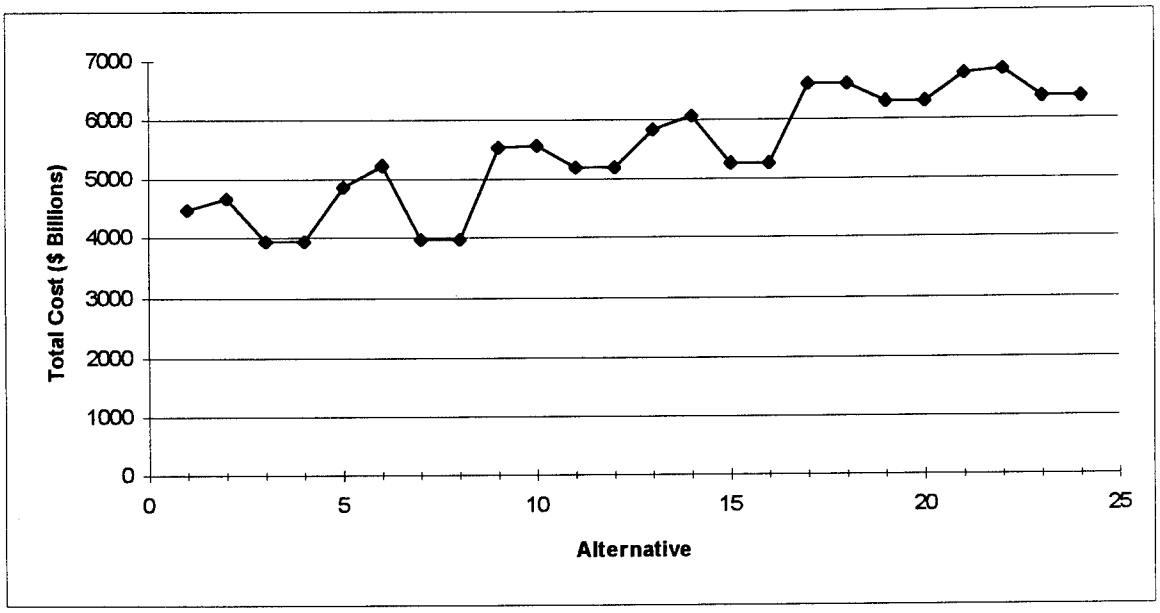

Figure 4-4. The Total Cost of Each Alternative

Figure 4-5 shows the mean and range of Total Costs for each alternative. Note that:

- The range of Total Costs appears to be wider for alternatives with a 150% Buildup Level (Alternatives 5 to 8, 13 to 16, 21 to 24) than for similar alternatives with a 100% Buildup Level (Alternatives 1 to 4, 9 to 12, 17 to 20, respectively).

- The range of Total Costs appears shorter for alternatives with a higher Base Force.

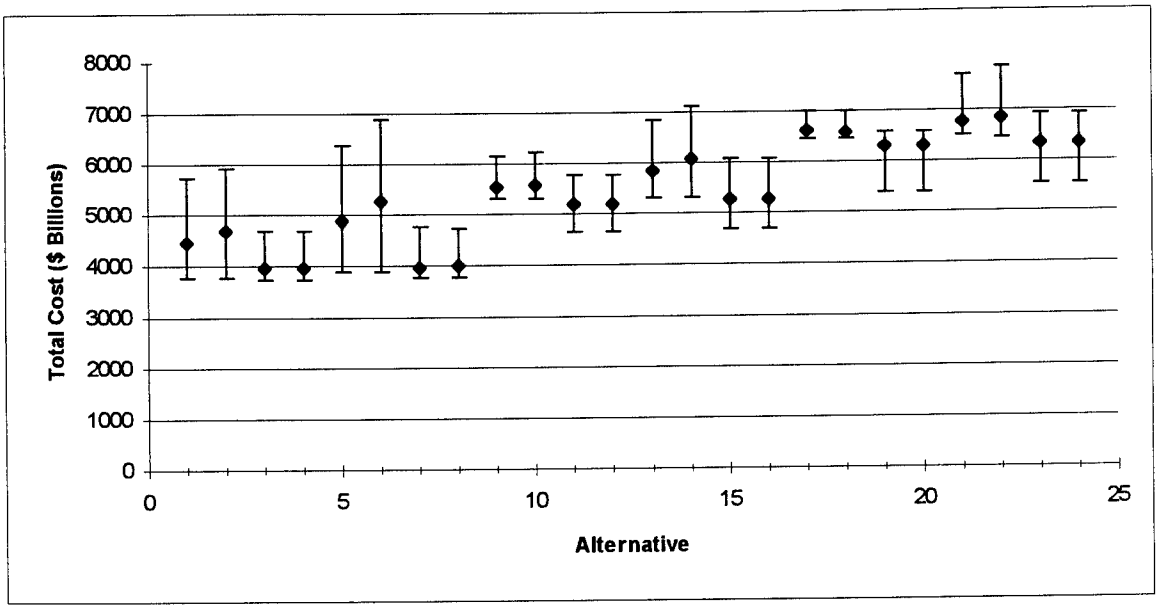

Figure 4-5. Variability in Total Cost

Value of Interest Lost. Figure 4-6 shows the mean Value of Interest Lost for each alternative, while Figure 4-7 shows the complete range of values for each alternative.

Note that:

- There is a downward trend in the mean values from left to right. This suggests that there is less risk of losing U.S. interests when a higher Base Force is maintained.
- The dips include alternatives with the higher Buildup Rate, suggesting that there is less risk of losing U.S. interests when forces are built up quickly.
- In general, the second alternative in each pair (i.e., peak or dip) has a lower Value of Interest Lost. This suggests that a low Demobilization Rate helps reduce the Value of Interest Lost.

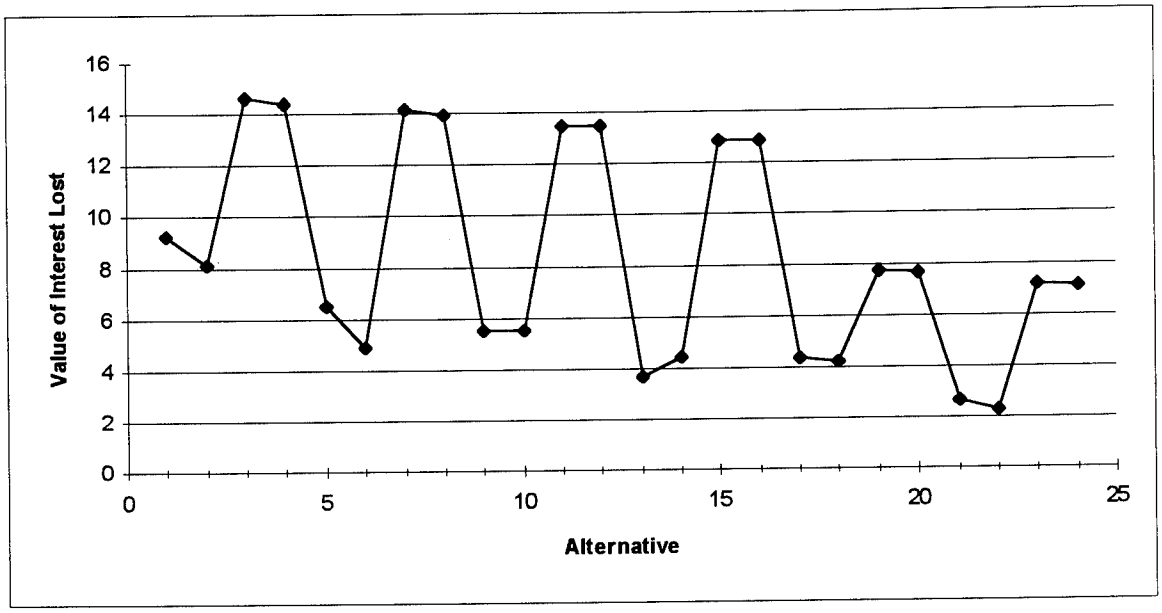

Figure 4-6. Value of Interest Lost for Each Alternative

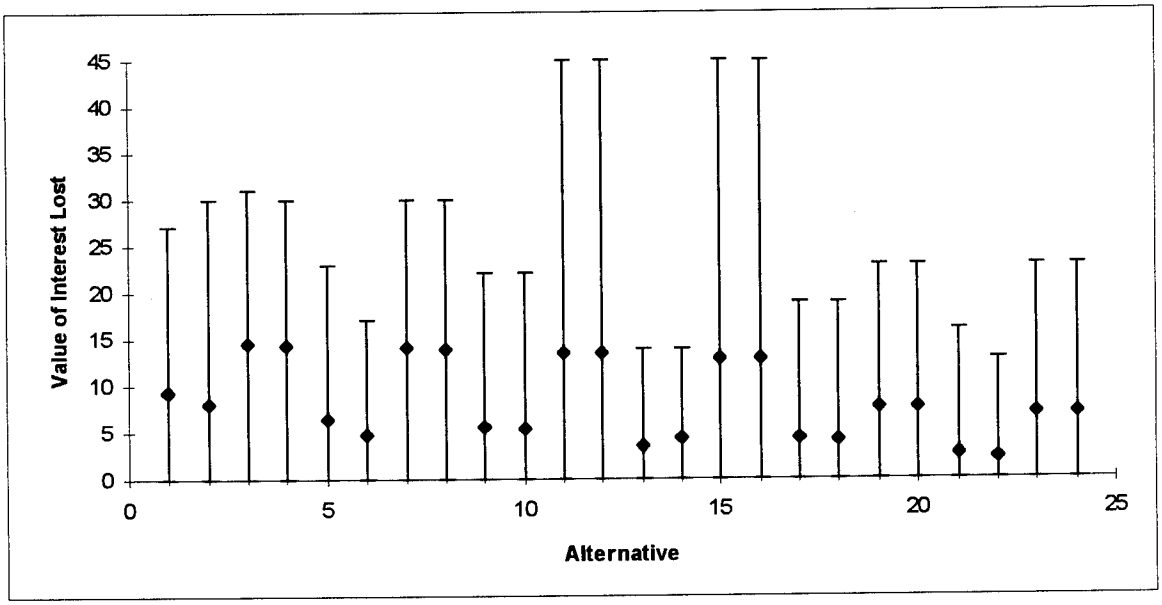

Figure 4-7. Variability in Value of Interest Lost

Percent of Time the Force Requirement Exceeds Total Force. Figures 4-8 and 4-9 summarize the data on the percent of time that the Force Requirement exceeds Total Force. Note that:

- Higher Base Forces and the higher Buildup Rate tend to reduce the risk that the Force Requirement will exceed the Total Force.
- The risk of being unprepared is as great for Alternatives 12, 13, 16, and 17 (where the Base Force is 2 MRC-equivalents) as it is for Alternatives 3, 4, 7, and 8 (where the Base Force is 1 MRC-equivalent). This suggests that having a higher Buildup Rate may be more important, in some scenarios, than having a larger Base Force.

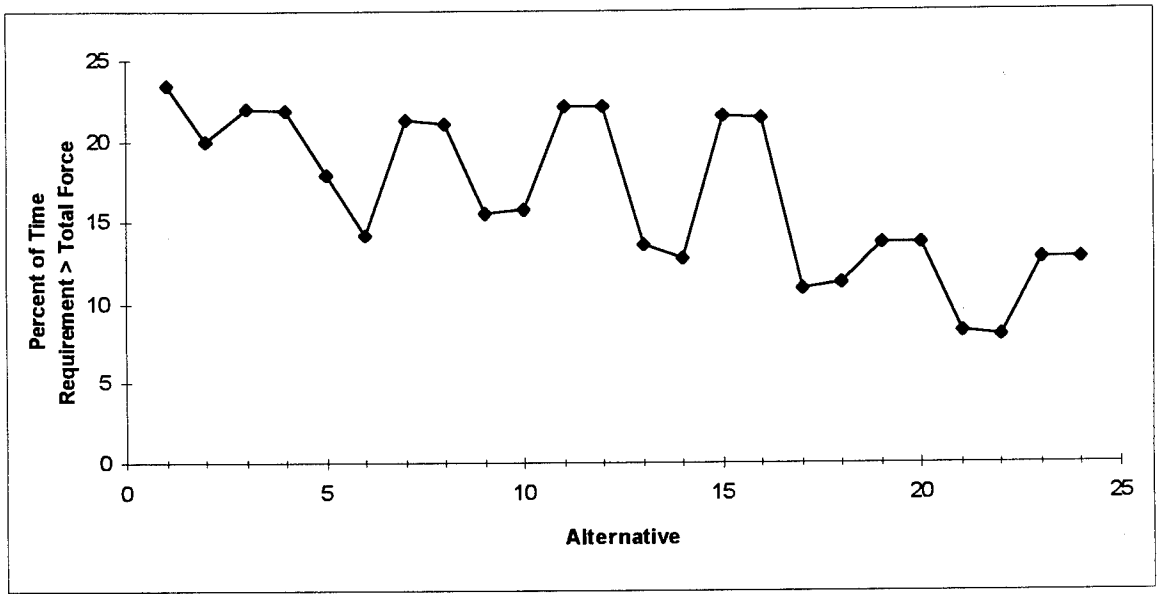

Figure 4-8. Percent of Time Requirement Exceeds Total Force for Each Alternative

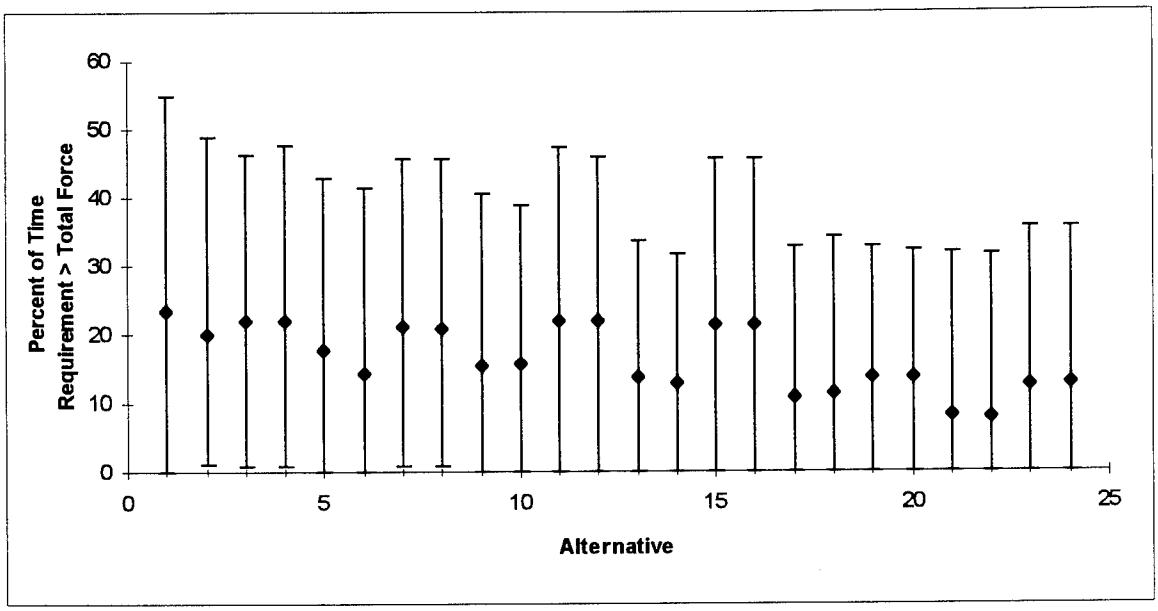

Figure 4-9. Variability in Percent of Time Requirement Exceeds Total Force

Evaluating Alternatives Against the Costs and Risks.

The following plots present several "views" of the policy alternatives. In each "view," the alternatives are plotted according to a pair of costs and/or risks. With each "view," insights can be gained and certain alternatives can be eliminated as too costly or too risky.

The plot in Figure 4-10 has Value of Interest Lost on the x-axis and Total Cost on the y-axis. When each alternative is placed on the plot according its mean Value of Interest Lost and its mean Total Cost, certain groupings of alternatives become apparent. In fact, in all of the "views" of the policy alternatives, these same groupings will remain relatively congruous. The groupings are tabulated in Table 4-3.

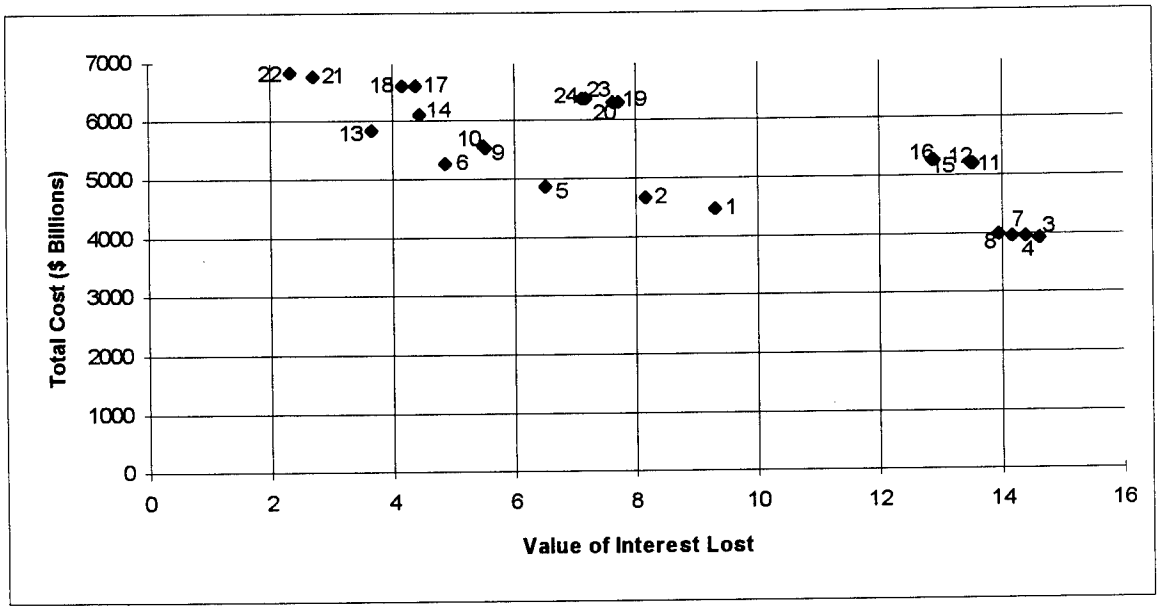

Figure 4-10. Total Cost vs. Value of Interest Lost

Table 4-3

Groupings of Alternatives

Grouping	Alternatives	Differentiating Characteristics
Group I	3, 4, 7, 8	Base Force = 1, **Buildup Rate = 0.2**
Group II	11, 12, 15, 16	Base Force = 2, **Buildup Rate = 0.2**
Group III	19, 20, 23, 24	Base Force = 3, **Buildup Rate = 0.2**
Pair (1, 2)	1, 2	Base Force = 1, Buildup Level = 100%, **Buildup Rate = 1**
Pair (5, 6)	5, 6	Base Force = 1, Buildup Level = 150%, **Buildup Rate = 1**
Pair (9, 10)	9, 10	Base Force = 2, Buildup Level = 100%, **Buildup Rate = 1**
Pair (13, 14)	13, 14	Base Force = 2, Buildup Level = 150%, **Buildup Rate = 1**
Pair (17, 18)	17, 18	Base Force = 3, Buildup Level = 100%, **Buildup Rate = 1**
Pair (21, 22)	21, 22	Base Force = 3, Buildup Level = 150%, **Buildup Rate = 1**

Figure 4-10 is now repeated with the alternative Groups circled and alternative Pairs connected by a line.

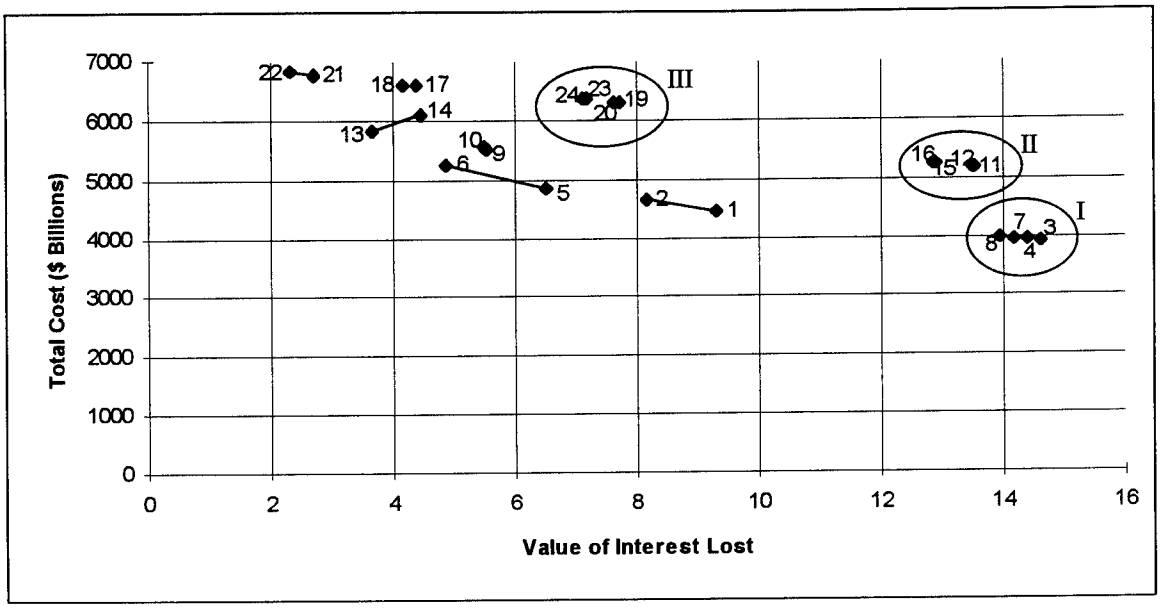

Figure 4-11. Total Cost vs. Value of Interest Lost
(with Alternatives Grouped)

With the groundwork laid, attention can now be turned to evaluating alternatives. Suggesting that being to the lower left corner of the plot is best, the following observations can be made:

- Since World War carries a Value of Interest equal to 10, choosing an alternative with a Value of Interest Lost less than 10 suggests that on the average no World Wars are lost. Eliminating alternatives with a Value of Interest Lost greater than or equal to 10 eliminates Groups I and II. These two groups consist of the alternatives with 1- or 2-MRC Base Forces and the lower Buildup Rate.

- Group III is dominated by six other alternatives: 5, 6, 9, 10, 13, and 14.

- Only Alternatives with the higher Buildup Rate seem to be reasonable choices. Among those, Alternatives 9, 10, 14, 17, and 18 are also dominated by other alternatives.

- Alternatives 1, 2, 5, 6, 13, 21, 22 are left undominated.

The next metric used to evaluate alternatives is the percent of time that the Force Requirement exceeds Total Force. Plotting this metric versus Total Cost and Value of Interest Lost yields Figures 4-12 and 4-13, respectively. The following observations can be made from these figures:

- Even with the higher Buildup Rate, the Force Requirement will exceed Total Force anywhere from 5 to 25 percent of the time.
- It might be useful to identify a maximum acceptable risk of having the Force Requirement exceed Total Force. If, for example, the maximum acceptable risk is 20%, then Groups I and II can be eliminated, as well as Alternative Pair (1, 2).
- In Figure 4-12, only Groups II and III and Alternatives 1, 9, and 10 are dominated.
- In Figure 4-13, Alternative 22 dominates all others.

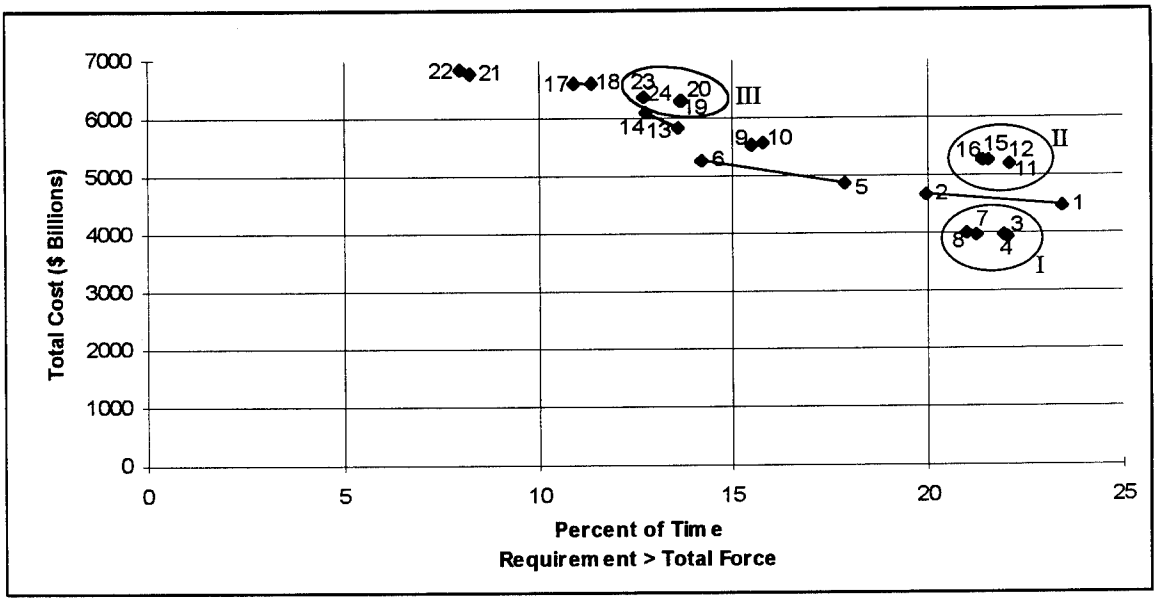

Figure 4-12. Total Cost vs. Percent of Time Force Requirement Exceeds Total Force

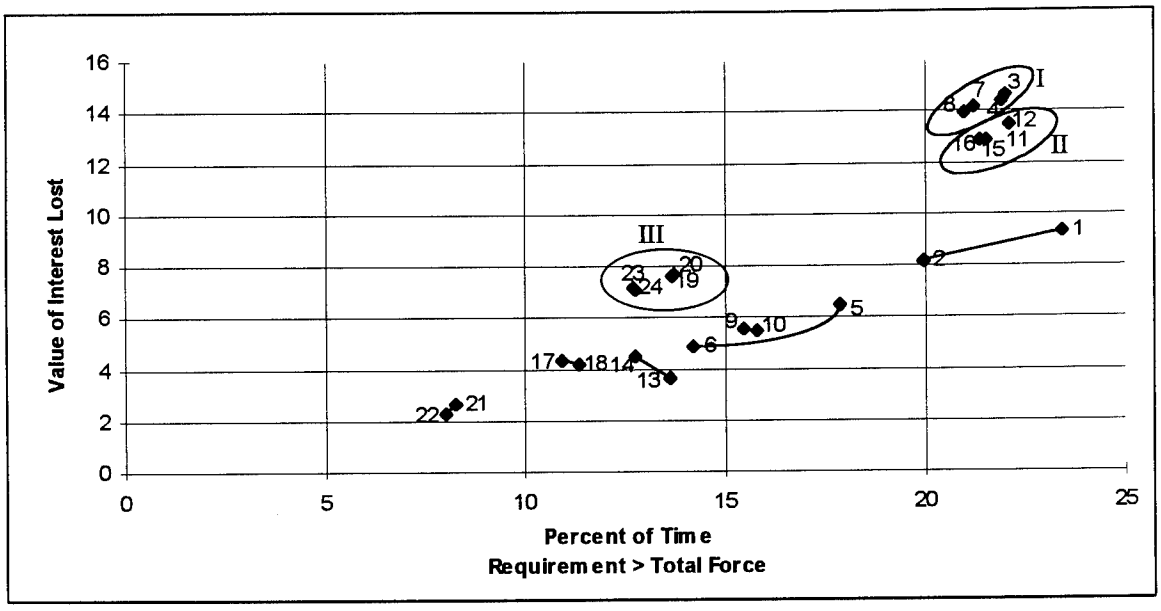

Figure 4-13. Value of Interest Lost vs. Percent of Time Force Requirement Exceeds Total Force

V. Conclusions and Recommendations

Conclusions.

Alternative 22 is the only alternative which is undominated in all "views."

- Alternative 22 consists of a 3-MRC Base Force, a 150% Buildup Level, a 1 MRC-per-year Buildup Rate, and a 0.2 MRC-per-year Demobilization Rate.

- Alternative 22 closely resembles the U.S. policy followed during the later years of the Cold War.

- Alternative 22 results in the lowest Value of Interest Lost and the lowest percent of time that the Force Requirement exceeds Total Force.

- However, Alternative 22 has the highest Total Cost of all alternatives. This high cost is the reason that such a policy alternative is being abandoned in the post-Cold War period.

Buildup Rate appears to be a key factor.

- A high Buildup Rate helps compensate for a smaller Base Force.

- The best policy should probably include the highest Buildup Rate possible. Unfortunately, the rate at which forces can be built up depends on the health of the defense-industrial base. The defense-industrial base is being weakened over time and is probably dependent, in part, on the size of the Base Force (i.e., the higher the Base Force, the more production that is required to maintain the Base Force).

The optimal policy alternative might be identified by determining the maximum amount of acceptable risk and choosing an alternative with acceptable risk and the lowest cost.

Recommendation.

Further study might include:

- Investigate how the timing of EWI influences the choice of alternatives. The timing of EWI is, in part, a function of the ability of the intelligence community to gather and process these EWI, but is also a function of how National Command

Authorities choose to respond to the EWI received. Such an investigation can be made with the current model by modifying EWI-timing parameters.

- Study the work that has been done to model force attrition and "upgrade" the attrition subroutine in the simulation model.

- Make the assumption that the frequency and nature of threats are dependent on the force structure and investigate how this assumption influences the choice of alternatives. Such an investigation can be made with the current model by changing the threat parameters when force structure parameters are changed.

- Model buildup rates as a function of the Base Force.

- Gather better cost data for future experimentation.

Appendix A: Simulation Model

MICROSOFT EXCEL SPREADSHEET

Figure A-1 shows the spreadsheet used to define simulation parameters and build the control statements. In the control statements, the parameters are generally listed in array form. To assure that the proper parameters were placed in the correct position in the arrays, the spreadsheet was linked to a Microsoft Word document. The Word document contained the text required for the control statements and drew the actual numbers from the spreadsheet through the link. The Word document was then saved as a text-only file and was ready for use by SLAM II.

SIMULATION PARAMETERS				
Run Date	3/6/1995			
Iterations Per Simulation	1			
Print Summary Report Every "X" Runs	1			
Time Increment for Build, Attrit, Demob	0.04			
DECISIONS				
Initial Base Force	2			
Buildup Level (%)	100			
Buildup Rate (TF/Year)	1		Note: Adjust Buildup Penalty	
Demobilization Rate (TF/Year)	1		Note: Adjust Demob Penalty	
GENERAL				
Planning Horizon (Years)	20			
Buildup Cost Penalty (% of TF/Year)	20			
Demobilization Cost Penalty (% of TF/Year)	20			
Lose Threshhold (%)	40			
Duration Penalty (% of shortage)	200			
THREAT TYPE 1 PARAMETERS				
Threat Level: Uniform (Low, High)	0.1	0.3		
Mean Time Between Threats	0.5			
Duration: Triangular (Min, Mode, Max)	0.125	0.5	1	
Time From EWI to Action Triangular (Min, Mode, Max)	0	0.25	0.5	
Intel Accuracy for Level: Uniform (%Low, %High)	20	20		
Attrition Rate (%/Year)	10			
P{Peacekeeping Only}	0.75			
THREAT TYPE 2 PARAMETERS				
Threat Level: Uniform (Low, High)	0.75	1.25		
Mean Time Between Threats	10			
Duration: Triangular (Min, Mode, Max)	0.25	1	2	
Time From EWI to Action Triangular (Min, Mode, Max)	0.25	0.5	0.75	
Intel Accuracy for Level: Uniform (%Low, %High)	30	30		
Attrition Rate (%/Year)	20			
P{Peacekeeping Only}	0			
THREAT TYPE 3 PARAMETERS				
Threat Level: Uniform (Low, High)	1.75	2.25		
Mean Time Between Threats	10			
Duration: Triangular (Min, Mode, Max)	0.5	1	3	
Time From EWI to Action Triangular (Min, Mode, Max)	0.25	0.75	1	
Intel Accuracy for Level: Uniform (%Low, %High)	30	30		
Attrition Rate (%/Year)	30			
P{Peacekeeping Only}	0			

Figure A-1. Spreadsheet for Defining Parameters

THREAT TYPE 4 PARAMETERS			
Threat Level: Uniform (Low, High)	4	6	
Earliest Occurence (Years)	10		
P{Occurence in Time Horizon}	0.5		
Duration: Triangular (Min, Mode, Max)	1	2	5
Time From EWI to Action Triangular (Min, Mode, Max)	1	2	5
Intel Accuracy for Level: Uniform (%Low, %High)	30	30	
Attrition Rate (%/Year)	40		
P{Evolving to Cold War}	0.5		
Size of Cold War: % of World War Level	50		
THREAT TYPE 5 PARAMETERS			
Threat Level: Uniform (Low, High)	2	3	
Earliest Occurence (Years)	8		
P{Occurence in Time Horizon}	0.5		
Duration: Triangular (Min, Mode, Max)	10	30	70
Time From EWI to Action Triangular (Min, Mode, Max)	0.5	1	3
Intel Accuracy for Level: Uniform (%Low, %High)	30	30	
Deterrent Force %-age	25		
Rate Change MRC %	75		

INTEREST PROBABILITIES				
Value of Interest	1	2	4	10
P{Type 1 has this interest}	0.8	0.2	0	0
P{Type 2 has this interest}	0.1	0.6	0.3	0
P{Type 3 has this interest}	0	0.2	0.8	0
P{Type 4 has this interest}	0	0	0	1
P{Type 5 has this interest}	0	0	0	1

COST ESTIMATES					
Force Size	0.5	1	2	3	4
Cost of Size	132	186.67619	264	323.3	373

Figure A-1. Spreadsheet for Defining Parameters (Cont.)

SLAM II CONTROL STATEMENTS

```
GEN,MICHAEL L. FREDLEY,THESIS,3/5/1995,100,Y,Y,Y/Y,Y,Y/S,72;
LIMITS,15,25,500;

ARRAY(1,15)/0.1,0.3,0,0.75,1.25,0,1.75,2.25,0,4,6,0,2,3,0;
INTLC,XX(64)=0.5,XX(65)=10,XX(66)=10;
ARRAY(2,15)/0,0,0,0,0,0,0,0,0,10,0,0,8,0,0;
ARRAY(3,15)/0.125,0.5,1,0.25,1,2,0.5,1,3,1,2,5,10,30,70;
ARRAY(4,15)/0,0.25,0.5,0.25,0.5,0.75,0.25,0.75,1,1,2,5,0.5,1,3;
ARRAY(5,15)/20,20,0,30,30,0,30,30,0,30,30,0,30,30,0;
ARRAY(6,15)/10,0,0,20,0,0,30,0,0,40,0,0,0,0,0;
ARRAY(7,15)/0.75,0,0,0,0,0,0,0,0,0,0,0,25,0,0;
ARRAY(8,15)/0,0,0,0,0,0,0,0,0,0,0,0,75,0,0;
ARRAY(9,15)/0,0,0,0,0,0,0,0,0,0.5,0,0,0,0,0;
ARRAY(10,15)/0,0,0,0,0,0,0,0,0,0.5,0,0,0.5,0,0;
ARRAY(11,15)/0,0,0,0,0,0,0,0,0,50,0,0,0,0,0;
ARRAY(30,4)/1,2,4,10;
ARRAY(31,15)/0.8,0.2,0,0.1,0.6,0.3,0,0.2,0.8,0,0,0,0,0,0;
INTLC,XX(41)=0.5,XX(43)=1,XX(45)=2,XX(47)=3,XX(49)=4;
INTLC,XX(42)=132,XX(44)=186.7,XX(46)=264,XX(48)=323,XX(50)=373;

INTLC,XX(3)=2;
INTLC,XX(8)=0.04;
INTLC,XX(9)=100;
INTLC,XX(10)=0.2;
INTLC,XX(12)=20;
INTLC,XX(16)=0.2;
INTLC,XX(18)=20;
INTLC,XX(33)=40;
INTLC,XX(36)=200;
INTLC,XX(83)=20;

NETWORK;
INITIALIZE,0,20,Y;
RECORD,TNOW,TIME,,T,.1,0,20,Y;
  VAR,XX(1),1,TOTAL FORCE,0,MAX;
  VAR,XX(2),2,AVAIL FORCE,0,MAX;
  VAR,XX(20),0,TF REQ,0,MAX;
  VAR,XX(24),4,CF REQ,0,MAX;
  VAR,XX(76),*,TOTAL COST,0,MAX;
  VAR,XX(59),*,COST PER YR,0,MAX;
  VAR,XX(79),*,NEG TF REQ,0,MAX;
  VAR,XX(80),*,NEG CF REQ,0,MAX;
  VAR,XX(92),*,NEG COMBAT,0,MAX;

FIN;
```

ATTRIBUTES, VARIABLES, AND FILES

Table A-1 gives a complete list of the attributes, variables, and files used in the network model.

Table A-1

Attributes, Variables, and Files

	ATRIBUTES	VARIABLES	FILE
1	Event Type	Total Force (TF)	Buildup Gate
2	Actual Conflict Level	Available Force (AF)	Await WW
3	EWI Estimate of Level	*Initial Base Force	Await CW
4	P{Low Interest}	Previous Maint Cost/Year	Preempt CW
5	P{Medium Interest}	Current Maint Cost/Year	Demob Gate
6	P{High Interest}	Time of last change in TF	Await MRC
7	Interest	Cum TF Cost	
8	Priority	*Build/Attrit/Demob Increm	
9	EWI Time	*Buildup Level/Safety Margin (%)	
10	Attrition Rate	*Buildup Rate (TF/Year)	
11	Time from EWI to Event	Buildup Addition	
12	Start Time	*Buildup Cost Penalty (%)	
13	Projected Conflict Duration	Cum Buildup Cost Penalty	
14	Force Assigned	Current Buildup Cost/Year	
15	Duration Remaining	Attrition Amount	
16	Projected End Time	*Demob Rate (TF/Year)	
17		Demobilization Amount	
18	Projected DF Req	*Demob Cost Penalty (%)	
19	Actual DF Req	Cum Demob Cost Penalty	
20		TF Req	
21		MRC TF Req	
22	Force Shortage	WW TF Req	
23	Force Shortage %	CW TF Req	
24		Committed Force Req	
25		Interest Lost	
26		Lose Threshhold (Decimal)	
27		Current Demob Cost/Year	
28		Force in MRC/WW	
29		Force in CW	
30		Total Committed Force	

Table A-1 (Cont.)

Attributes, Variables, and Files

31		Cum Projected Duration	
32		Cum Actual Duration	
33		Lose Threshhold (%)	
34		Start Time for Neg TF-TF Req	
35		Cum Time for Neg TF-TF Req	
36		*Duration Penalty (% of shortage)	
37		Force to Assign	
38		Start Time for Neg TF-CF Req	
39		Cum Time for Neg TF-CF Req	
40		Extra Duration Due to Shortage	
41		Cost Size 1	
42		Cost for Size 1	
43		Cost Size 2	
44		Cost for Size 2	
45		Cost Size 3	
46		Cost for Size 3	
47		Cost Size 4	
48		Cost for Size 4	
49		Cost Size 5	
50		Cost for Size 5	
51		Temp - Assignments	
52		Temp - Assignments	
53		Temp - Assignments	
54		Temp - Assignments	
55		Temp-Cost Branching	
56		Temp-Cost Branching	
57		Temp-Cost Branching	
58		Temp-Cost Branching	
59		Current Total Cost/Year	
60		Proposed TF after Demob	
61		Index for Entities	
62		Index for Entities	
63		Index for Entities	
64		MTBE1	
65		MTBE2	
66		MTBE3	
67		Earliest Occurence of WW	

Table A-1 (Cont.)

Attributes, Variables, and Files

68		Earliest Occurence of CW	
69		Old TF Req	
70		Old CF Req	
71		Costing	
72		Costing	
73		Costing	
74		Change in TF	
75		Change in CF	
76		Total Cost	
77		# CW	
78		Duration Penalty/Proj Duration	
79		TF - TF Req	
80		TF - CF Req	
81		1' when CW preempts MRC	
82		1' if WW Started	
83		Planning Horizon	
84		1' if TF-TF Req<0	
85		1' if TF-CF Req<0	
86		% of Time TF-TF Req<0	
87		% of Time TF-CF Req<0	
88		Lower Limit of WW Uniform Dist	
89		Upper Limit of WW Uniform Dist	
90		Lower Limit of CW Uniform Dist	
91		Upper Limit of CW Uniform Dist	
92		TF-ActF Req	
93		1' if TF-ActF Req < 0	
94		Start Time Neg TF-ActF Req < 0	
95		Cum Time Neg TF-ActF Req < 1	
96		ActF Req	
97		% Time TF < Req	
98		Temp-Branching on XX(4), XX(5)	
* denotes variables input from control statements			

SLAM II NETWORK CODE

```
GATE,BUILDUP,,1;
      GATE,DEMOB,,5;
      RESOURCE,MRC(0),6;
      RESOURCE,CW,4,3;
      RESOURCE,WW,2;
;
EWI1  CREATE,EXPON(XX(64)),,9,,1;
      ACTIVITY,,TNOW.EQ.0,TERM;
      ACTIVITY/1,,TNOW.NE.0;
M1A   ASSIGN,ATRIB(1)=1,XX(61)=1,XX(62)=2,XX(63)=3,1;
      ACTIVITY;
M2    GOON,1;
      ACTIVITY,,NRUSE(WW).EQ.0,GTATR;
      ACTIVITY,,NRUSE(WW).GT.0,TERM;
;
EWI2  CREATE,EXPON(XX(65)),,9,,1;
      ACTIVITY,,TNOW.EQ.0,TERM;
      ACTIVITY/2,,TNOW.NE.0;
M1B   ASSIGN,ATRIB(1)=2,XX(61)=4,XX(62)=5,XX(63)=6,1;
      ACTIVITY,,,M2;
;
PTMRC ASSIGN,XX(70)=XX(24),XX(24)=XX(24)+ATRIB(3),XX(75)=XX(24)-XX(70),1;
      ACTIVITY;
M3    ASSIGN,XX(21)=XX(21)+ATRIB(3)*XX(9)/100,XX(69)=XX(20),XX(80)=XX(1)-XX(24),
      1;
      ACTIVITY,,XX(23).LT.XX(24)*XX(9)/100;
      ACTIVITY,,XX(23).GE.XX(24)*XX(9)/100,M4B;
M4A   ASSIGN,XX(20)=XX(24)*XX(9)/100,XX(74)=XX(20)-XX(69),XX(79)=XX(1)-XX(20),1;
      ACTIVITY;
M5    GOON,1;
      ACTIVITY,ATRIB(11);
M6    GOON,1;
      ACTIVITY,,NRUSE(WW).EQ.0;
      ACTIVITY,,NRUSE(WW).GT.0,TERM;
STMRC ASSIGN,XX(70)=XX(24),XX(24)=XX(24)-ATRIB(3)+ATRIB(2),XX(75)=XX(24)-XX(70),
      1;
      ACTIVITY;
      ASSIGN,XX(96)=XX(96)+ATRIB(2),1;
      ACTIVITY;
M7    ASSIGN,XX(21)=XX(21)-ATRIB(3)*XX(9)/100+ATRIB(2)*XX(9)/100,XX(80)=XX(1)-
      XX(24),XX(92)=XX(1)-XX(96),1;
      ACTIVITY;
M8    ASSIGN,ATRIB(22)=ATRIB(2),ATRIB(15)=ATRIB(13),XX(69)=XX(20),1;
      ACTIVITY,,XX(23).LT.XX(24)*XX(9)/100;
      ACTIVITY,,XX(23).GE.XX(24)*XX(9)/100,M9B;
M9A   ASSIGN,XX(20)=XX(24)*XX(9)/100,XX(74)=XX(20)-XX(69),XX(79)=XX(1)-XX(20),1;
      ACTIVITY;
M10   GOON,1;
      ACTIVITY;
M11   ALTER,MRC,1,1;
      ACTIVITY;
M12   GOON,1;
      ACTIVITY,,XX(82).EQ.1,CXMRC;
      ACTIVITY,,XX(82).EQ.0;
```

```
M13   GOON,1;
      ACTIVITY,,XX(2).GE.ATRIB(22).AND.XX(81).EQ.0;
      ACTIVITY,,XX(2).LT.ATRIB(22).AND.XX(81).EQ.0,M14B;
      ACTIVITY,,XX(81).EQ.1,M24;
M14A  ASSIGN,XX(37)=ATRIB(22),1;
      ACTIVITY;
M15   AWAIT(6/1),MRC,,1;
      ACTIVITY;
M16   ASSIGN,ATRIB(14)=ATRIB(14)+XX(37),ATRIB(22)=ATRIB(22)-XX(37),ATRIB(23)=
      ATRIB(22)/ATRIB(2),1;
      ACTIVITY;
M17   ASSIGN,XX(2)=XX(2)-XX(37),ATRIB(15)=ATRIB(15)+XX(8)*ATRIB(23)*XX(36)/100,
      1;
      ACTIVITY;
M18   ASSIGN,XX(28)=XX(28)+XX(37),XX(30)=XX(28)+XX(29),1;
      ACTIVITY,,ATRIB(23).LT.XX(26);
      ACTIVITY,,ATRIB(23).GE.XX(26),LOSE;
M19   ASSIGN,XX(15)=ATRIB(2)*ATRIB(10)*XX(8)/100,ATRIB(14)=ATRIB(14)-XX(15),
      ATRIB(22)=ATRIB(22)+XX(15),1;
      ACTIVITY;
M20   ASSIGN,XX(28)=XX(28)-XX(15),XX(1)=XX(1)-XX(15),XX(30)=XX(28)+XX(29),1;
      ACTIVITY,XX(8);
M21   ASSIGN,ATRIB(15)=ATRIB(15)-XX(8),1;
      ACTIVITY;
M21B  ASSIGN,XX(79)=XX(1)-XX(20),XX(80)=XX(1)-XX(24),XX(92)=XX(1)-XX(96),1;
      ACTIVITY,0.000001;
M22   GOON,1;
      ACTIVITY,,ATRIB(15).GE.XX(8);
      ACTIVITY,ATRIB(15),ATRIB(15).LT.XX(8),M26;
M23   FREE,MRC,1;
      ACTIVITY,,,M12;
M26   ASSIGN,XX(31)=XX(31)+ATRIB(13),XX(32)=XX(32)+TNOW-ATRIB(12),XX(40)=XX(32)-
      XX(31),1;
      ACTIVITY;
ENDM  ASSIGN,XX(2)=XX(2)+ATRIB(14),XX(21)=XX(21)-ATRIB(2)*XX(9)/100,XX(28)=XX(
      28)-ATRIB(14),1;
      ACTIVITY;
M27   FREE,MRC,1;
      ACTIVITY;
M28   ALTER,MRC,-1,1;
      ACTIVITY;
M29   ASSIGN,XX(30)=XX(28)+XX(29),1;
      ACTIVITY,,NRUSE(WW).EQ.0;
      ACTIVITY,,NRUSE(WW).GT.0,M34;
M30   ASSIGN,XX(70)=XX(24),XX(24)=XX(24)-ATRIB(2),XX(75)=XX(24)-XX(70),1;
      ACTIVITY;
M30B  ASSIGN,XX(96)=XX(96)-ATRIB(2),1;
      ACTIVITY;
M31   ASSIGN,XX(69)=XX(20),XX(80)=XX(1)-XX(24),XX(92)=XX(1)-XX(96),1;
      ACTIVITY,,XX(23).LT.XX(24)*XX(9)/100;
      ACTIVITY,,XX(23).GE.XX(24)*XX(9)/100,M32B;
M32A  ASSIGN,XX(20)=XX(24)* XX(9)/100,XX(74)=XX(20)-XX(69),XX(79)=XX(1)-XX(20),
      1;
      ACTIVITY;
M33   GOON,1;
      ACTIVITY;
M34   TERMINATE;
```

```
M32B  ASSIGN,XX(20)=XX(23),XX(74)=XX(20)-XX(69),XX(79)=XX(1)-XX(20),1;
      ACTIVITY,,,M33;
M14B  ASSIGN,XX(37)=XX(2),1;
      ACTIVITY,,,M15;
M24   ASSIGN,XX(2)=XX(2)+ATRIB(14),ATRIB(22)=ATRIB(22)+ATRIB(14),ATRIB(15)=
      ATRIB(15)-XX(8),1;
      ACTIVITY;
M25   ASSIGN,XX(28)=XX(28)-ATRIB(14),XX(30)=XX(28)+XX(29),ATRIB(14)=0,1;
      ACTIVITY,XX(8),,M12;
M9B   ASSIGN,XX(20)=XX(23),XX(74)=XX(20)-XX(69),XX(79)=XX(1)-XX(20),1;
      ACTIVITY,,,M10;
M4B   ASSIGN,XX(20)=XX(23),XX(74)=XX(20)-XX(69),XX(79)=XX(1)-XX(20),1;
      ACTIVITY,,,M5;
;
EWI3  CREATE,EXPON(XX(66)),,9,,1;
      ACTIVITY,,TNOW.EQ.0,TERM;
      ACTIVITY/3,,TNOW.NE.0;
M1C   ASSIGN,ATRIB(1)=3,XX(61)=7,XX(62)=8,XX(63)=9,1;
      ACTIVITY,,,M2;
;
EWI4  CREATE,XX(67),,9,,1;
      ACTIVITY,,TNOW.EQ.0,TERM;
      ACTIVITY,,TNOW.NE.0;
W1    ASSIGN,ATRIB(1)=4,XX(61)=10,XX(62)=11,XX(63)=12,1;
      ACTIVITY/4,,NNCNT(4).EQ.0;
      ACTIVITY,,NNCNT(4).GT.0,TERM;
W2    AWAIT(2/1),WW,BALK(TERM),1;
      ACTIVITY,,,GTATR;
;
PTWW  ASSIGN,XX(22)=ATRIB(3)*XX(9)/100,XX(69)=XX(20),XX(70)=XX(24),1;
      ACTIVITY,,XX(21).GT.XX(22);
      ACTIVITY,,XX(21).LE.XX(22),W3B;
W3A   ASSIGN,XX(20)=XX(21),XX(24)=XX(21)/XX(9)*100,XX(79)=XX(1)-XX(20),1;
      ACTIVITY;
W4    ASSIGN,XX(74)=XX(20)-XX(69),XX(75)=XX(24)-XX(70),XX(80)=XX(1)-XX(24),1;
      ACTIVITY,ATRIB(11);
W5    ASSIGN,XX(82)=1,XX(69)=XX(20),XX(70)=XX(24),1;
      ACTIVITY;
STWW  ASSIGN,XX(22)=ATRIB(2)*XX(9)/100,ATRIB(15)=ATRIB(13),1;
      ACTIVITY,,XX(21).GT.XX(22);
      ACTIVITY,,XX(21).LE.XX(22),W6B;
W6A   ASSIGN,XX(20)=XX(21),ATRIB(2)=XX(21)/XX(9)*100,XX(24)=ATRIB(2),1;
      ACTIVITY;
W7A   ASSIGN,XX(96)=ATRIB(2),1;
      ACTIVITY;
W7    ASSIGN,XX(79)=XX(1)-XX(20),XX(80)=XX(1)-XX(24),XX(92)=XX(1)-XX(96),1;
      ACTIVITY;
W8    ASSIGN,ATRIB(22)=ATRIB(2),XX(74)=XX(20)-XX(69),XX(75)=XX(24)-XX(70),1;
      ACTIVITY;
W9    PREEMPT(4),CW,CXCW,,1;
      ACTIVITY,XX(8);
W10   ASSIGN,ATRIB(15)=ATRIB(15)-XX(8),XX(21)=0,1;
      ACTIVITY;
W11   GOON,1;
      ACTIVITY,,XX(2).GE.ATRIB(22);
      ACTIVITY,,XX(2).LT.ATRIB(22),W12B;
W12A  ASSIGN,XX(37)=ATRIB(22),1;
```

```
      ACTIVITY;
W13   ASSIGN,ATRIB(22)=ATRIB(22)-XX(37),ATRIB(23)=ATRIB(22)/ATRIB(2),ATRIB(15)=
      ATRIB(15)+XX(8)*ATRIB(23)*XX(36)/100,1;
      ACTIVITY;
W14   ASSIGN,XX(28)=XX(28)+XX(37),XX(30)=XX(28)+XX(29),ATRIB(14)=ATRIB(14)+XX(
      37),1;
      ACTIVITY;
W15   ASSIGN,XX(2)=XX(2)-XX(37),1;
      ACTIVITY,,ATRIB(23).LT.XX(26);
      ACTIVITY,,ATRIB(23).GE.XX(26),LOSE;
W16   ASSIGN,XX(15)=ATRIB(2)*ATRIB(10)*XX(8)/100,ATRIB(14)=ATRIB(14)-XX(15),
      ATRIB(22)=ATRIB(22)+XX(15),1;
      ACTIVITY;
W17   ASSIGN,XX(28)=XX(28)-XX(15),XX(30)=XX(28)+XX(29),XX(1)=XX(1)-XX(15),1;
      ACTIVITY,XX(8);
W18   ASSIGN,ATRIB(15)=ATRIB(15)-XX(8),1;
      ACTIVITY;
W18B  ASSIGN,XX(79)=XX(1)-XX(20),XX(80)=XX(1)-XX(24),XX(92)=XX(1)-XX(96),1;
      ACTIVITY,0.000001;
W19   GOON,1;
      ACTIVITY,,ATRIB(15).GE.XX(8),W11;
      ACTIVITY,ATRIB(15),ATRIB(15).LT.XX(8);
W20   ASSIGN,XX(31)=XX(31)+ATRIB(13),XX(32)=XX(32)+TNOW-ATRIB(12),XX(40)=XX(32)-
      XX(31),1;
      ACTIVITY;
ENDW  ASSIGN,XX(2)=XX(2)+ATRIB(14),XX(22)=0,ATRIB(14)=0,1;
      ACTIVITY;
W21   ASSIGN,XX(69)=XX(20),XX(20)=0,XX(74)=XX(20)-XX(69),1;
      ACTIVITY;
W22   ASSIGN,XX(70)=XX(24),XX(24)=0,XX(75)=XX(24)-XX(70),2;
      ACTIVITY;
W22B  ASSIGN,XX(96)=0,1;
      ACTIVITY;
W23   ASSIGN,XX(28)=XX(28)-ATRIB(14),XX(30)=XX(28)+XX(29),XX(92)=XX(1)-XX(96),1;
      ACTIVITY;
W24   ASSIGN,XX(79)=XX(1)-XX(20),XX(80)=XX(1)-XX(24),XX(82)=0,1;
      ACTIVITY;
W25   FREE,WW,1;
      ACTIVITY;
W26   FREE,CW,2;
      ACTIVITY;
      ACTIVITY,,ARRAY(9,10),W28;
W27   TERMINATE;
W28   AWAIT(3/1),CW,,1;
      ACTIVITY;
W29   ASSIGN,ATRIB(1)=5,ATRIB(2)=ATRIB(2)*ARRAY(11,10)/100,ATRIB(8)=ATRIB(7)*
      100+ATRIB(7)/ATRIB(2),1;
      ACTIVITY;
W30   ASSIGN,XX(51)=ARRAY(3,13),XX(52)=ARRAY(3,14),XX(53)=ARRAY(3,15),1;
      ACTIVITY;
W31   ASSIGN,ATRIB(13)=TRIAG(XX(51),XX(52),XX(53)),ATRIB(19)=ATRIB(2)*ARRAY(7,
      13)/100,1;
      ACTIVITY,0.000001,,STCW;
W12B  ASSIGN,XX(37)=XX(2),1;
      ACTIVITY,,,W13;
W6B   ASSIGN,XX(20)=XX(22),XX(24)=ATRIB(2),1;
      ACTIVITY,,,W7A;
```

```
W3B   ASSIGN,XX(20)=XX(22),XX(24)=ATRIB(3),XX(79)=XX(1)-XX(20),1;
      ACTIVITY,,,W4;
;
EWI5  CREATE,XX(68),,9,,1;
      ACTIVITY,,TNOW.EQ.0,TERM;
      ACTIVITY,,TNOW.NE.0;
C1    ASSIGN,ATRIB(1)=5,XX(61)=13,XX(62)=14,XX(63)=15,1;
      ACTIVITY/5,,NRUSE(WW).EQ.0.AND.NNCNT(5).EQ.0;
      ACTIVITY,,NRUSE(WW).GT.0.OR.NNCNT(5).GT.0,TERM;
C2    AWAIT(3/1),CW,BALK(TERM),1;
      ACTIVITY,,,GTATR;
;
PTCW  ASSIGN,XX(23)=ATRIB(3)*XX(9)/100,ATRIB(19)=ATRIB(2)*ARRAY(7,13)/100,ATRIB(
      18)=ATRIB(3)*ARRAY(7,13)/100,1;
      ACTIVITY;
C3    ASSIGN,XX(70)=XX(24),XX(24)=XX(24)+ATRIB(18),XX(75)=XX(24)-XX(70),1;
      ACTIVITY,,XX(23).LT.XX(24)*XX(9)/100;
      ACTIVITY,,XX(23).GE.XX(24)*XX(9)/100,C4B;
C4A   ASSIGN,XX(69)=XX(20),XX(20)=XX(24)*XX(9)/100,XX(74)=XX(20)-XX(69),1;
      ACTIVITY;
C5    ASSIGN,XX(79)=XX(1)-XX(20),XX(80)=XX(1)-XX(24),1;
      ACTIVITY,ATRIB(11);
STCW  ASSIGN,ATRIB(12)=TNOW,ATRIB(22)=ATRIB(19),XX(70)=XX(24),1;
      ACTIVITY,,NRUSE(WW).EQ.0;
      ACTIVITY,,NRUSE(WW).GT.0,CXCW;
C6    ASSIGN,XX(23)=ATRIB(2)*XX(9)/100,XX(24)=XX(24)-ATRIB(18)+ATRIB(19),XX(75)=
      XX(24)-XX(70),1;
      ACTIVITY,,XX(23).LT.XX(24)*XX(9)/100;
      ACTIVITY,,XX(23).GE.XX(24)*XX(9)/100,C7B;
C7A   ASSIGN,XX(69)=XX(20),XX(20)=XX(24)*XX(9)/100,XX(74)=XX(20)-XX(69),1;
      ACTIVITY;
C8A   ASSIGN,XX(96)=XX(96)+ATRIB(19),1;
      ACTIVITY;
C8    ASSIGN,XX(79)=XX(1)-XX(20),XX(80)=XX(1)-XX(24),XX(92)=XX(1)-XX(96),1;
      ACTIVITY;
C9    ASSIGN,XX(64)=XX(64)/ARRAY(8,13)*100,XX(65)=XX(65)/ARRAY(8,13)*100,XX(66)=
      XX(66)/ARRAY(8,13)*100,1;
      ACTIVITY;
C10   ASSIGN,XX(77)=XX(77)+1,ATRIB(15)=ATRIB(13),1;
      ACTIVITY;
C11   GOON,1;
      ACTIVITY,,XX(2).GE.ATRIB(22);
      ACTIVITY,,XX(2).LT.ATRIB(22).AND.NRUSE(MRC).EQ.0,C12B;
      ACTIVITY,,XX(2).LT.ATRIB(22).AND.NRUSE(MRC).GE.1,C16;
C12A  ASSIGN,XX(37)=ATRIB(22),1;
      ACTIVITY;
C13   ASSIGN,XX(2)=XX(2)-XX(37),XX(29)=XX(29)+XX(37),XX(30)=XX(28)+XX(29),1;
      ACTIVITY;
C14   ASSIGN,ATRIB(22)=ATRIB(22)-XX(37),ATRIB(14)=ATRIB(14)+XX(37),1;
      ACTIVITY,XX(8),ATRIB(22).GT.0.AND.ATRIB(15).GE.XX(8);
      ACTIVITY,ATRIB(15),ATRIB(15).LT.XX(8),C18;
      ACTIVITY,ATRIB(15),ATRIB(22).EQ.0,C18;
C15   ASSIGN,ATRIB(15)=ATRIB(15)-XX(8),1;
      ACTIVITY,,,C11;
C18   FREE,CW,1;
      ACTIVITY;
TRCW  ASSIGN,XX(23)=0,XX(29)=0,XX(30)=XX(28)+XX(29),1;
```

```
      ACTIVITY;
C19   ASSIGN,XX(23)=0,XX(64)=XX(64)*ARRAY(8,13)/100,XX(65)=XX(65)*ARRAY(8,13)/
      100,1;
      ACTIVITY;
C20   ASSIGN,XX(2)=XX(2)+ATRIB(14),XX(66)=XX(66)*ARRAY(8,13)/100,1;
      ACTIVITY,,NRUSE(WW).EQ.0;
      ACTIVITY,,NRUSE(WW).GT.0,C24;
C21   ASSIGN,XX(70)=XX(24),XX(24)=XX(24)-ATRIB(19),XX(75)=XX(24)-XX(70),1;
      ACTIVITY;
C22   ASSIGN,XX(69)=XX(20),XX(20)=XX(21),XX(74)=XX(20)-XX(69),1;
      ACTIVITY;
C22B  ASSIGN,XX(96)=XX(96)-ATRIB(19),1;
      ACTIVITY;
C23   ASSIGN,XX(79)=XX(1)-XX(20),XX(80)=XX(1)-XX(24),XX(92)=XX(1)-XX(96),1;
      ACTIVITY;
C24   TERMINATE;
C12B  ASSIGN,XX(37)=XX(2),1;
      ACTIVITY,,,C13;
C16   ASSIGN,XX(81)=1,ATRIB(15)=ATRIB(15)-XX(8),1;
      ACTIVITY,XX(8);
C17   ASSIGN,XX(81)=0,1;
      ACTIVITY,,,C11;
C7B   ASSIGN,XX(69)=XX(20),XX(20)=XX(23),XX(74)=XX(20)-XX(69),1;
      ACTIVITY,,,C8A;
C4B   ASSIGN,XX(69)=XX(20),XX(20)=XX(23),XX(74)=XX(20)-XX(69),1;
      ACTIVITY,,,C5;
;
GTATR GOON,1;
      ACTIVITY;
A1    ASSIGN,XX(51)=ARRAY(1,XX(61)),XX(52)=ARRAY(1,XX(62)),ATRIB(2)=UNFRM(XX(
      51),XX(52)),1;
      ACTIVITY;
A2    ASSIGN,XX(53)=ATRIB(2)-ATRIB(2)*ARRAY(5,XX(61))/100,XX(54)=ATRIB(2)+ATRIB(
      2)*ARRAY(5,XX(62))/100,ATRIB(3)=UNFRM(XX(53),XX(54)),1;
      ACTIVITY;
A3    ASSIGN,ATRIB(4)=ARRAY(31,XX(61)),ATRIB(5)=ARRAY(31,XX(62)),ATRIB(6)=ARRAY(
      31,XX(63)),1;
      ACTIVITY;
A4    ASSIGN,XX(51)=ARRAY(4,XX(61)),XX(52)=ARRAY(4,XX(62)),XX(53)=ARRAY(4,XX(
      63)),1;
      ACTIVITY;
A5    ASSIGN,ATRIB(11)=TRIAG(XX(51),XX(52),XX(53)),ATRIB(12)=ATRIB(9)+ATRIB(11),
      1;
      ACTIVITY;
A6    ASSIGN,XX(51)=ARRAY(3,XX(61)),XX(52)=ARRAY(3,XX(62)),XX(53)=ARRAY(3,XX(
      63)),1;
      ACTIVITY;
A7    ASSIGN,ATRIB(13)=TRIAG(XX(51),XX(52),XX(53)),ATRIB(16)=ATRIB(12)+ATRIB(
      13),1;
      ACTIVITY;
A8    GOON,1;
      ACTIVITY,,ATRIB(1).LE.3;
      ACTIVITY,,ATRIB(1).GE.4,A14;
A9    GOON,1;
      ACTIVITY,,ATRIB(4);
      ACTIVITY,,ATRIB(5),A10B;
      ACTIVITY,,ATRIB(6),A10C;
```

```
A10A  ASSIGN,ATRIB(7)=ARRAY(30,1),ATRIB(8)=ATRIB(7)*100+ATRIB(7)/ATRIB(2),1;
      ACTIVITY;
A11   GOON,1;
      ACTIVITY,,ARRAY(7,XX(61));
      ACTIVITY,,1-ARRAY(7,XX(61)),A12B;
A12A  ASSIGN,ATRIB(10)=0,1;
      ACTIVITY;
A13   GOON,1;
      ACTIVITY,,,PTMRC;
A12B  ASSIGN,ATRIB(10)=ARRAY(6,XX(61)),1;
      ACTIVITY,,,A13;
A10B  ASSIGN,ATRIB(7)=ARRAY(30,2),ATRIB(8)=ATRIB(7)*100+ATRIB(7)/ATRIB(2),1;
      ACTIVITY,,,A11;
A10C  ASSIGN,ATRIB(7)=ARRAY(30,3),ATRIB(8)=ATRIB(7)*100+ATRIB(7)/ATRIB(2),1;
      ACTIVITY,,,A11;
A14   GOON,1;
      ACTIVITY;
A15   ASSIGN,ATRIB(7)=ARRAY(30,4),ATRIB(8)=ATRIB(7)*100+ATRIB(7)/ATRIB(2),ATRIB(
      10)=ARRAY(6,XX(61)),1;
      ACTIVITY;
A16   GOON,1;
      ACTIVITY,,ATRIB(1).EQ.4,PTWW;
      ACTIVITY,,ATRIB(1).EQ.5,PTCW;
;
B1A   DETECT,XX(1),XN,XX(3),.00001,1;
      ACTIVITY;
B2    AWAIT(1),BUILDUP,BLOCK,1;
      ACTIVITY,,XX(20).GT.XX(1).OR.XX(24).GT.XX(1);
      ACTIVITY,,XX(20).LE.XX(1).AND.XX(24).LE.XX(1),B12;
B3    CLOSE,BUILDUP,1;
      ACTIVITY;
B4    ASSIGN,XX(7)=XX(7)+XX(5)*TNOW-XX(5)*XX(6),XX(6)=TNOW,XX(76)=XX(7)+XX(13)+
      XX(19),1;
      ACTIVITY,XX(8);
B5    ASSIGN,XX(11)=XX(10)*XX(8),XX(1)=XX(1)+XX(11),XX(2)=XX(2)+XX(11),1;
      ACTIVITY;
B6    GOON,1;
      ACTIVITY,,XX(1).GE.XX(43).AND.XX(1).LT.XX(45);
      ACTIVITY,,XX(1).LT.XX(43),B7A;
      ACTIVITY,,XX(1).GE.XX(47),B7D;
      ACTIVITY,,XX(1).GE.XX(45).AND.XX(1).LT.XX(47),B7C;
B7B   ASSIGN,XX(55)=XX(43),XX(56)=XX(45),XX(57)=XX(44),XX(58)=XX(46),1;
      ACTIVITY;
B8    ASSIGN,XX(71)=XX(1)-XX(55),XX(72)=XX(56)-XX(55),XX(73)=XX(58)-XX(57),1;
      ACTIVITY;
B9    ASSIGN,XX(4)=XX(5),XX(5)=XX(57)+XX(71)/XX(72)*XX(73),XX(13)=XX(13)+XX(5)*
      XX(8)*XX(12)/100-XX(4)*XX(8)*XX(12)/100,1;
      ACTIVITY;
B9B   ASSIGN,XX(14)=XX(5)*XX(12)/100-XX(4)*XX(12)/100,XX(59)=XX(5)+XX(14),1;
      ACTIVITY;
B10   ASSIGN,XX(79)=XX(1)-XX(20),XX(80)=XX(1)-XX(24),XX(92)=XX(1)-XX(96),1;
      ACTIVITY,,XX(1).LT.XX(20).OR.XX(1).LT.XX(24);
      ACTIVITY,,XX(1).GE.XX(20).AND.XX(1).GE.XX(24),B13;
B11   GOON,1;
      ACTIVITY,0.000001,,B4;
B13   GOON,1;
      ACTIVITY,,XX(1).LT.XX(3),B11;
```

```
      ACTIVITY,,XX(1).GE.XX(3);
B14   OPEN,BUILDUP,1;
      ACTIVITY;
B15   TERMINATE;
B7A   ASSIGN,XX(55)=XX(41),XX(56)=XX(43),XX(57)=XX(42),XX(58)=XX(44),1;
      ACTIVITY,,,B8;
B7D   ASSIGN,XX(55)=XX(47),XX(56)=XX(49),XX(57)=XX(48),XX(58)=XX(50),1;
      ACTIVITY,,,B8;
B7C   ASSIGN,XX(55)=XX(45),XX(56)=XX(47),XX(57)=XX(46),XX(58)=XX(48),1;
      ACTIVITY,,,B8;
B12   GOON,1;
      ACTIVITY,,XX(1).LT.XX(3),B3;
      ACTIVITY,,XX(1).GE.XX(3),TERM;
;
B1B   DETECT,XX(20),XP,XX(1),0,1;
      ACTIVITY,,,B2;
;
INIT  CREATE,,,,1,1;
      ACTIVITY;
I1    ASSIGN,XX(88)=ARRAY(2,10),XX(89)=ARRAY(2,10)+XX(83)/ARRAY(10,10)-ARRAY(2,
      10)/ARRAY(10,10),XX(67)=UNFRM(XX(88),XX(89)),1;
      ACTIVITY;
I2    ASSIGN,XX(90)=ARRAY(2,13),XX(91)=ARRAY(2,13)+XX(83)/ARRAY(10,13)-ARRAY(2,
      13)/ARRAY(10,13),XX(68)=UNFRM(XX(90),XX(91)),1;
      ACTIVITY;
I3    ASSIGN,XX(1)=XX(3)+0.000001,XX(2)=XX(3)+0.000001,XX(26)=XX(33)/100,1;
      ACTIVITY;
I4    GOON,1;
      ACTIVITY,,XX(1).GE.XX(43).AND.XX(1).LT.XX(45);
      ACTIVITY,,XX(1).LT.XX(43),I5A;
      ACTIVITY,,XX(1).GE.XX(47),I5D;
      ACTIVITY,,XX(1).GE.XX(45).AND.XX(1).LT.XX(47),I5C;
I5B   ASSIGN,XX(55)=XX(43),XX(56)=XX(45),XX(57)=XX(44),XX(58)=XX(46),1;
      ACTIVITY;
I6    ASSIGN,XX(71)=XX(1)-XX(55),XX(72)=XX(56)-XX(55),XX(73)=XX(58)-XX(57),1;
      ACTIVITY;
I7    ASSIGN,XX(5)=XX(57)+XX(71)/XX(72)*XX(73),1;
      ACTIVITY;
I8    TERMINATE;
I5A   ASSIGN,XX(55)=XX(41),XX(56)=XX(43),XX(57)=XX(42),XX(58)=XX(44),1;
      ACTIVITY,,,I6;
I5D   ASSIGN,XX(55)=XX(47),XX(56)=XX(49),XX(57)=XX(48),XX(58)=XX(50),1;
      ACTIVITY,,,I6;
I5C   ASSIGN,XX(55)=XX(45),XX(56)=XX(47),XX(57)=XX(46),XX(58)=XX(48),1;
      ACTIVITY,,,I6;
;
B1C   DETECT,XX(1),XN,XX(20),0,1;
      ACTIVITY,,,B2;
;
B1D   DETECT,XX(24),XP,XX(1),0,1;
      ACTIVITY,,,B2;
;
LOSE  GOON,1;
      ACTIVITY;
L1    ASSIGN,XX(25)=XX(25)+ATRIB(7),1;
      ACTIVITY,,ATRIB(1).LE.3,ENDM;
      ACTIVITY,,ATRIB(1).EQ.4,ENDW;
```

```
;
B1E   DETECT,XX(1),XN,XX(24),0,1;
      ACTIVITY,,,B2;
;
TERM  TERMINATE;
;
NTF1  DETECT,XX(79),XN,-0.000001,0,1;
      ACTIVITY;
NTF2  ASSIGN,XX(84)=1,XX(34)=TNOW,1;
      ACTIVITY;
NTF3  TERMINATE;
;
CXMRC GOON,1;
      ACTIVITY;
CXM1  ALTER,MRC,-1,1;
      ACTIVITY;
CXM2  ASSIGN,XX(2)=XX(2)+ATRIB(14),XX(28)=XX(28)-ATRIB(14),XX(30)=XX(28)+XX(29),
      1;
      ACTIVITY;
CXM3  TERMINATE;
;
PTF1  DETECT,XX(79),XP,-0.000001,0,1;
      ACTIVITY;
PTF2  ASSIGN,XX(84)=0,XX(35)=XX(35)+TNOW-XX(34),1;
      ACTIVITY;
PTF3  TERMINATE;
;
D1A   DETECT,XX(74),XN,-0.000001,0,1;
      ACTIVITY;
D2    AWAIT(5/1),DEMOB,BLOCK,1;
      ACTIVITY;
D3    CLOSE,DEMOB,1;
      ACTIVITY,,XX(20).LT.XX(1).AND.XX(24).LT.XX(1);
      ACTIVITY,,XX(20).GE.XX(1).OR.XX(24).GE.XX(1),D12;
D4    ASSIGN,XX(60)=XX(1)-XX(16)*XX(8),1;
      ACTIVITY,,XX(60).GE.XX(20).AND.XX(60).GE.XX(24);
      ACTIVITY,,XX(60).LT.XX(20).OR.XX(60).LT.XX(24),D12;
D5    GOON,1;
      ACTIVITY,,XX(60).GT.XX(3);
      ACTIVITY,,XX(60).LE.XX(3),D12;
D6    ASSIGN,XX(7)=XX(7)+XX(5)*TNOW-XX(5)*XX(6),XX(6)=TNOW,XX(76)=XX(7)+XX(13)+
      XX(19),1;
      ACTIVITY,XX(8);
D7    ASSIGN,XX(17)=XX(16)*XX(8),XX(1)=XX(1)-XX(17),XX(2)=XX(2)-XX(17),1;
      ACTIVITY;
D8    GOON,1;
      ACTIVITY,,XX(1).GE.XX(43).AND.XX(1).LT.XX(45);
      ACTIVITY,,XX(1).LT.XX(43),D9A;
      ACTIVITY,,XX(1).GE.XX(47),D9D;
      ACTIVITY,,XX(1).GE.XX(45).AND.XX(1).LT.XX(47),D9C;
D9B   ASSIGN,XX(55)=XX(43),XX(56)=XX(45),XX(57)=XX(44),XX(58)=XX(46),1;
      ACTIVITY;
D10   ASSIGN,XX(71)=XX(1)-XX(55),XX(72)=XX(56)-XX(55),XX(73)=XX(58)-XX(57),1;
      ACTIVITY;
D11   ASSIGN,XX(4)=XX(5),XX(5)=XX(57)+XX(71)/XX(72)*XX(73),XX(19)=XX(19)+XX(4)*
      XX(8)*XX(18)/100-XX(5)*XX(8)*XX(18)/100,1;
      ACTIVITY;
```

```
D11B  ASSIGN,XX(27)=XX(4)*XX(18)/100-XX(5)*XX(18)/100,XX(59)=XX(5)+XX(27),1;
      ACTIVITY;
D11C  ASSIGN,XX(79)=XX(1)-XX(20),XX(80)=XX(1)-XX(24),XX(92)=XX(1)-XX(96),1;
      ACTIVITY,,,D4;
D9A   ASSIGN,XX(55)=XX(41),XX(56)=XX(43),XX(57)=XX(42),XX(58)=XX(44),1;
      ACTIVITY,,,D10;
D9D   ASSIGN,XX(55)=XX(47),XX(56)=XX(49),XX(57)=XX(48),XX(58)=XX(50),1;
      ACTIVITY,,,D10;
D9C   ASSIGN,XX(55)=XX(45),XX(56)=XX(47),XX(57)=XX(46),XX(58)=XX(48),1;
      ACTIVITY,,,D10;
D12   ASSIGN,XX(74)=1,XX(75)=1,1;
      ACTIVITY;
D13   OPEN,DEMOB,1;
      ACTIVITY,,,TERM;
;
END   CREATE,XX(83),,,,1;
      ACTIVITY,,TNOW.EQ.0,TERM;
      ACTIVITY,,TNOW.GT.0;
END1  ASSIGN,XX(7)=XX(7)+XX(5)*TNOW-XX(5)*XX(6),XX(76)=XX(7)+XX(13)+XX(19),2;
      ACTIVITY,,XX(93).EQ.1;
      ACTIVITY,,XX(85).EQ.1,PCF2;
      ACTIVITY,,XX(84).EQ.1,PTF2;
      ACTIVITY,,,TERM;
PAF2  ASSIGN,XX(93)=0,XX(95)=XX(95)+TNOW-XX(94),1;
      ACTIVITY;
PAF3  TERMINATE;
PCF2  ASSIGN,XX(85)=0,XX(39)=XX(39)+TNOW-XX(38),1;
      ACTIVITY;
PCF3  TERMINATE;
;
NCF1  DETECT,XX(80),XN,-0.000001,0,1;
      ACTIVITY;
NCF2  ASSIGN,XX(85)=1,XX(38)=TNOW,1;
      ACTIVITY;
NCF3  TERMINATE;
;
D1B   DETECT,XX(75),XN,-0.000001,0,1;
      ACTIVITY,,,D2;
;
CXCW  GOON,1;
      ACTIVITY,,TNOW.GT.ATRIB(12),TRCW;
      ACTIVITY,,TNOW.LT.ATRIB(12);
      ACTIVITY,,TNOW.EQ.ATRIB(12),CXC3;
CXC1  ASSIGN,XX(23)=0,XX(79)=XX(1)-XX(20),XX(80)=XX(1)-XX(24),1;
      ACTIVITY;
CXC2  ASSIGN,XX(92)=XX(1)-XX(96),1;
      ACTIVITY;
CXC4  TERMINATE;
CXC3  FREE,CW,1;
      ACTIVITY,,,CXC1;
;
PCF1  DETECT,XX(80),XP,-0.000001,0,1;
      ACTIVITY,,,PCF2;
;
NAF1  DETECT,XX(92),XN,-0.000001,0,1;
      ACTIVITY;
NAF2  ASSIGN,XX(93)=1,XX(94)=TNOW,1;
```

```
      ACTIVITY;
NAF3  TERMINATE;
;
PAF1  DETECT,XX(92),XP,-0.000001,0,1;
      ACTIVITY,,,PAF2;
      END;
```

Appendix B: Output Data

The following pages contain the data from the simulation runs of each alternative.

Table B-1
Alternative 1 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	23	0	0	0	0	3778.9	0.12	0	3779.02	0	0	0	0	0	0	0
Max	56	6	6	1	1	5732.88	19.275	3.029	5741.18	27	1.595	0.075	10.956	54.8	10.956	54.8
Range	33	6	6	1	1	1953.98	19.155	3.029	1962.16	27	1.595	0.075	10.956	54.8	10.956	54.8
Mean	38.1	2.03	2.09	0.46	0.44	4453.42	9.65653	1.32964	4464.41	9.28571	0.2935	0.01502	4.88723	24.4347	4.68471	23.4235
St Dev	6.85	1.39	1.43	0.5	0.5	477.391	3.82654	0.66117	479.88	6.23622	0.31535	0.01696	2.42822	12.1422	2.48288	12.4133
RUN																
1	43	2	1	1	0	3883.46	7.015	1.036	3891.51	0	0.019	0.001	2.362	11.8	2.362	11.8
2	33	0	3	1	0	4780.43	11.635	1.522	4793.59	15	0.288	0.021	7.248	36.2	7.248	36.2
3	34	2	3	0	0	4140.53	9.86	1.339	4151.73	10	0.354	0.018	4.493	22.5	4.493	22.5
4	48	2	5	0	1	4786.73	14.22	1.916	4802.86	17	0.301	0.011	6.474	32.4	5.713	28.6
5	43	1	3	0	1	4431.78	12.15	1.344	4445.28	5	0.385	0.015	5.696	28.5	4.09	20.4
6	46	2	6	0	1	4692.17	16.045	2.064	4710.28	26	0.448	0.016	8.42	42.1	7.36	36.8
7	50	2	1	0	0	3988.11	8.6	1.353	3998.06	5	0.118	0.004	3.198	16	3.198	16
8	36	1	1	1	0	3974.24	8.22	0.531	3983	3	0.042	0.002	2.993	15	2.993	15
9	34	1	2	1	1	5732.88	7.82	0.473	5741.18	10	0	0	7.499	37.5	5.805	29
10	43	1	1	0	0	4006.79	4.415	0.859	4012.06	4	0.233	0.009	1.862	9.3	1.862	9.3
11	41	2	2	1	0	4039.57	8.175	0.813	4048.56	7	0.06	0.003	3.406	17	3.406	17
12	33	1	1	0	1	3918.32	6.14	0.346	3924.81	5	0.018	0.001	2.321	11.6	1.846	9.2
13	39	1	1	1	0	4516.11	8.93	1.253	4526.3	15	0.008	0.001	5.128	25.6	5.778	28.9
14	34	3	0	1	0	5286.53	6.89	0.413	5293.84	10	0	0	6.646	33.2	6.622	33.1
15	45	1	3	1	0	4183.26	9.74	1.219	4194.22	6	0.288	0.011	4.704	23.5	4.704	23.5
16	40	2	0	1	0	3904.72	7.325	0.623	3912.66	0	0.015	0.001	2.573	12.9	2.573	12.9
17	45	2	1	0	1	3863.55	5.3	1.021	3869.87	6	0.045	0.002	1.893	9.5	1.842	9.2
18	31	4	3	1	1	4917.05	17.88	2.019	4936.95	9	0.93	0.048	7.075	35.4	9.824	49.1
19	40	0	0	0	0	3778.9	0.12	0	3779.02	0	0.001	0	0	0	0	0
20	40	5	2	0	0	4180.4	12.455	1.952	4194.8	3	0.375	0.015	5.329	26.6	5.329	26.6
21	35	0	2	0	1	5020.77	8.855	0.902	5030.53	4	0.406	0.021	4.169	20.8	3.139	15.7
22	39	2	5	1	1	4945.89	13.485	1.153	4960.53	18	1.595	0.075	8.671	43.4	8.671	43.4
23	50	1	0	0	0	3830.75	2.835	0.543	3834.13	0	0.001	0	0.921	4.6	0.921	4.6
24	32	2	2	0	0	4076.53	8.78	1.235	4086.55	4	0.209	0.012	2.953	14.8	4.091	20.5
25	39	1	1	0	0	4053.64	4.595	0.895	4059.13	7	0.075	0.004	2.406	12	2.406	12
26	28	3	1	1	1	5267.87	9.145	1.762	5278.77	14	0.152	0.011	7.674	38.4	7.626	38.1
27	34	1	3	1	0	4528.36	15.86	2.799	4547.02	17	0.772	0.054	7.126	35.6	7.126	35.6
28	32	2	1	0	0	3974.88	6.4	1.272	3982.55	3	0.246	0.015	2.888	14.4	2.888	14.4

Table B-1
Alternative 1 Results

29	41	2	1	1	0	3948.04	8.17	1.552	3957.76	10	0.01	0	2.816	14.1	2.816	14.1
30	49	1	3	1	0	4432.66	13.085	1.417	4447.16	10	0.324	0.015	6.334	31.7	6.334	31.7
31	38	6	0	0	0	3981.73	10.475	2.072	3994.28	2	0.269	0.011	3.742	18.7	3.742	18.7
32	41	3	2	1	1	4847.91	6.805	1.133	4855.85	12	0	0	6.022	30.1	5.417	27.1
33	43	2	1	0	0	4088.76	6.08	1.113	4095.95	9	0.152	0.007	3.377	16.9	3.377	16.9
34	38	3	0	1	0	4004.14	7.275	1.433	4012.85	12	0.001	0	2.467	12.3	2.467	12.3
35	36	0	5	1	0	4463.59	11.71	1.024	4476.32	13	0.611	0.039	3.562	17.8	6.853	34.3
36	29	1	4	0	1	4706.26	14.605	1.867	4722.73	15	0.683	0.039	7.708	38.5	6.527	32.6
37	39	1	1	0	0	3876.39	3.875	0.756	3881.02	5	0.033	0.002	1.429	7.1	1.429	7.1
38	48	0	1	0	0	3787.21	2.105	0.397	3789.71	4	0.001	0	0.564	2.8	0.564	2.8
39	31	3	2	1	1	5616.99	15.925	1.572	5634.49	8	0.124	0.009	7.509	37.5	6.901	34.5
40	32	1	1	1	1	4076.36	8.915	1.02	4086.3	4	0	0	3.073	15.4	1.553	7.8
41	48	0	1	1	0	4643.64	9.49	0.952	4654.08	16	0.001	0	6.931	34.7	6.931	34.7
42	43	3	2	0	1	4621.1	11.125	1.125	4633.35	5	0.127	0.005	5.265	26.3	3.865	19.3
43	42	1	2	0	0	4291.05	9.54	1.893	4302.48	12	0.871	0.037	5.738	28.7	5.738	28.7
44	31	0	3	1	1	5091.77	11.55	1.122	5104.45	9	0.223	0.013	5.976	29.9	4.434	22.2
45	29	4	3	0	1	4083.19	7.555	1.495	4092.24	5	0.244	0.013	3.642	18.2	3.616	18.1
46	29	4	4	1	1	5322.89	12.89	1.523	5337.3	19	0.478	0.038	9.705	48.5	9.705	48.5
47	34	2	3	1	1	5013.26	12.045	1.596	5026.91	21	0.23	0.016	8.337	41.7	8.337	41.7
48	27	0	1	0	1	4970.61	7.725	0.73	4979.06	2	0.039	0.003	3.288	16.4	1.893	9.5
49	43	2	6	0	0	4730.16	15.145	3.029	4748.33	20	0.45	0.017	8.141	40.7	8.141	40.7
50	34	2	2	0	1	4345.88	8.945	1.127	4355.95	9	0.336	0.019	3.929	19.6	2.882	14.4
51	33	2	5	0	0	4404.13	13.205	2.329	4419.67	16	0.326	0.017	5.649	28.2	5.649	28.2
52	31	3	0	0	0	3832.86	2.74	0.533	3836.14	3	0.053	0.003	1.057	5.3	1.057	5.3
53	45	2	1	0	1	4382.04	6.065	0.509	4388.62	4	0.001	0	2.162	10.8	1.207	6
54	39	2	1	0	0	4083.09	7.695	1.52	4092.31	2	0.134	0.005	3.516	17.6	3.516	17.6
55	36	2	1	0	0	3842.22	3.44	0.679	3846.34	5	0.005	0	1.077	5.4	1.077	5.4
56	45	2	3	0	1	4775.36	12.7	1.628	4789.69	10	0.25	0.008	6.381	31.9	5.277	26.4
57	48	2	1	1	0	3942.36	8	0.552	3950.91	2	0.001	0	2.787	13.9	2.787	13.9
58	36	1	0	0	1	4375.06	5.975	0.359	4381.39	1	0.05	0.003	2.149	10.7	0.719	3.6
59	30	5	2	1	0	4413.76	10.96	2.17	4426.89	11	0.2	0.014	5.503	27.5	5.503	27.5
60	39	3	1	1	0	4273.46	9.21	1.83	4284.5	10	0.082	0.004	5.18	25.9	5.18	25.9
61	50	2	2	1	0	4247.7	9.34	0.982	4258.02	1	0.397	0.018	1.66	8.3	5.945	29.7
62	35	2	1	1	0	4704.57	11.325	1.24	4717.13	13	0.204	0.013	5.483	27.4	5.448	27.2
63	43	5	3	1	1	5242.34	19.275	2.503	5264.12	11	0.196	0.009	9.163	45.8	8.567	42.8
64	44	2	2	0	1	4170.02	11.505	1.153	4182.68	5	0.002	0	4.47	22.4	2.975	14.9
65	32	1	3	0	1	5028.08	7.415	0.499	5036	12	0.927	0.058	4.496	22.5	4.261	21.3
66	45	6	2	1	0	5256	14.9	2.639	5273.54	16	0.392	0.02	10.956	54.8	10.956	54.8

Table B-1
Alternative 1 Results

67	23	1	1	1	1	4655.67	8.395	0.609	4664.67	10	0	0	4.493	22.5	3.198	16
68	27	0	2	1	0	3851.23	5.155	0.371	3856.76	6	0.267	0.018	2.432	12.2	2.432	12.2
69	30	5	2	1	1	4847.5	9.48	1.834	4858.82	17	0.755	0.044	7.409	37	7.206	36
70	41	2	4	1	1	4786.19	17.04	2.509	4805.74	22	0.566	0.025	8.567	42.8	8.567	42.8
71	34	3	2	0	0	4172.85	9.555	1.892	4184.3	7	0.556	0.027	4.614	23.1	4.614	23.1
72	56	1	3	0	1	4641.4	12.61	1.26	4655.27	15	0.834	0.029	7.524	37.6	6.138	30.7
73	31	0	1	0	0	3905.68	3.145	0.605	3909.43	1	0.107	0.007	1.32	6.6	1.32	6.6
74	36	3	1	0	1	4965.83	9.33	1.026	4976.19	3	0.028	0.001	3.76	18.8	2.417	12.1
75	25	2	2	0	1	5342.17	11.22	1.183	5354.57	6	0.497	0.035	5.717	28.6	5.258	26.3
76	33	1	2	1	0	5155.79	16.64	1.888	5174.32	5	0.784	0.053	9.349	46.7	10.226	51.1
77	32	2	4	0	1	4619.11	10.32	1.321	4630.75	9	0.209	0.011	4.7	23.5	4.334	21.7
78	55	2	2	0	0	3862.04	5.52	1.06	3868.62	8	0.047	0.002	1.889	9.4	1.889	9.4
79	35	5	2	0	0	4036.85	9.985	1.763	4048.6	10	0.151	0.007	4.277	21.4	4.277	21.4
80	39	2	2	1	1	4898.92	16.61	2.328	4917.86	16	0.196	0.009	7.556	37.8	6.497	32.5
81	48	2	3	0	0	4237.25	10.065	1.989	4249.3	10	0.54	0.02	5.231	26.2	5.231	26.2
82	36	2	1	1	0	4332.7	11.24	2.105	4346.05	15	0.053	0.003	4.885	24.4	4.885	24.4
83	30	1	0	0	0	3861.3	2.9	0.555	3864.76	1	0.001	0	1.048	5.2	1.048	5.2
84	38	2	4	1	1	4736.08	12.635	2.285	4751	23	0.763	0.042	9.374	46.9	9.342	46.7
85	35	1	2	0	1	4353.73	10.935	1.509	4366.17	3	0.233	0.011	4.577	22.9	3.553	17.8
86	41	5	3	0	0	4122.29	10.145	2.013	4134.44	12	0.321	0.012	4.673	23.4	4.673	23.4
87	33	4	1	0	1	4613.24	7.44	0.476	4621.15	6	0.062	0.003	3.274	16.4	2.64	13.2
88	48	1	4	0	0	4399.51	7.95	1.582	4409.05	7	0.617	0.02	5.154	25.8	5.154	25.8
89	38	2	2	1	1	4812.23	6.07	0.364	4818.66	10	0.001	0	4.481	22.4	4.206	21
90	42	4	4	0	0	4593.15	14.31	2.853	4610.31	19	0.98	0.04	8.352	41.8	8.352	41.8
91	40	3	1	1	1	4067.56	12.005	1.786	4081.35	7	0.309	0.014	4.621	23.1	3.891	19.5
92	32	1	2	1	0	4180.42	6	0.226	4186.65	10	0	0	3.025	15.1	3.025	15.1
93	40	1	1	1	0	4676.45	9.285	1.847	4687.58	13	0.161	0.009	6.526	32.6	6.526	32.6
94	47	3	3	1	1	4238.07	13.22	1.729	4253.02	14	0.833	0.036	6.341	31.7	6.341	31.7
95	37	2	2	1	0	4106.14	10.88	1.331	4118.35	1	0.224	0.011	4.614	23.1	4.614	23.1
96	44	2	2	0	0	4024.6	7.805	1.55	4033.96	10	0.367	0.016	3.511	17.6	3.511	17.6
97	29	3	4	1	0	5279.13	12.665	1.504	5293.3	27	0.96	0.069	8.061	40.3	7.808	39
98	32	2	2	0	1	4846.83	12.33	1.572	4860.73	2	0.294	0.014	6.049	30.2	4.194	21
99	41	1	6	1	1	5132.87	13.16	1.48	5147.51	20	0.403	0.022	8.78	43.9	8.78	43.9
100	40	0	2	0	0	4123.59	7.27	0.728	4131.59	13	1.14	0.058	5.003	25	5.003	25

Table B-2
Alternative 2 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	22	0	0	0	0	3764.77	2.04	0.124	3767.22	0	0	0	0.423	2.1	0.219	1.1
Max	56	5	6	1	1	5895.16	14.4	1.912	5905.66	30	0.75	0.047	11.624	58.1	9.789	48.9
Range	34	5	6	1	1	2130.39	12.36	1.788	2138.44	30	0.75	0.047	11.201	56	9.57	47.8
Mean	38.7	1.8	1.88	0.49	0.48	4668.72	8.76786	0.95977	4678.45	8.14286	0.195969	0.009714	4.262755	21.31224	3.991408	19.95204
St Dev	6.51	1.19	1.46	0.5	0.5	515.268	2.73322	0.42264	516.8	6.00846	0.194414	0.010324	2.050164	10.24513	2.008228	10.03805
RUN																
1	43	2	1	1	0	3905.67	7.4	1.108	3914.18	0	0.021	0.001	2.12	10.6	2.12	10.6
2	33	0	3	1	0	5150.31	10.945	1.37	5162.63	13	0.202	0.014	6.983	34.9	6.983	34.9
3	34	2	3	0	0	4192.39	8.75	1.123	4202.26	11	0.049	0.003	3.695	18.5	3.695	18.5
4	48	2	5	0	1	5043.12	11.745	1.437	5056.3	17	0.263	0.01	5.494	27.5	4.653	23.3
5	43	1	3	0	1	4536.35	10.875	1.097	4548.32	5	0.34	0.013	4.931	24.7	3.445	17.2
6	46	2	6	0	1	4946.81	14.4	1.681	4962.89	26	0.465	0.017	7.547	37.7	6.487	32.4
7	50	2	1	0	0	4043.86	8.48	1.23	4053.57	4	0.115	0.004	2.9	14.5	2.9	14.5
8	36	1	1	1	0	4050.1	9.275	0.745	4060.12	1	0.04	0.002	3.246	16.2	3.246	16.2
9	34	1	2	1	1	5764.52	8.475	0.566	5773.56	10	0	0	7.597	38	5.805	29
10	43	1	1	0	0	4124.99	4.675	0.93	4130.6	3	0.277	0.011	2.107	10.5	2.107	10.5
11	41	2	2	1	0	4259.67	8.725	0.934	4269.33	6	0.074	0.004	3.588	17.9	3.588	17.9
12	33	1	1	0	1	3921.18	6.67	0.446	3928.3	5	0.018	0.001	2.361	11.8	1.846	9.2
13	39	1	1	1	0	4668.1	8.035	0.666	4676.8	12	0.001	0	5.211	26.1	5.211	26.1
14	37	3	0	1	0	5301.39	7.175	0.488	5309.05	10	0	0	6.662	33.3	6.662	33.3
15	38	5	1	0	1	4420.98	13.205	1.734	4435.92	2	0.132	0.005	4.98	24.9	3.691	18.5
16	47	3	4	0	1	5260.01	12.565	1.746	5274.32	18	0.425	0.017	6.117	30.6	5.861	29.3
17	41	1	0	0	0	3764.77	2.04	0.406	3767.22	1	0.001	0	0.423	2.1	0.423	2.1
18	48	1	0	1	0	4087.9	9.095	0.465	4097.46	0	0.001	0	0.456	2.3	3.525	17.6
19	46	3	2	1	0	4369.94	12.085	1.111	4383.14	4	0.018	0.001	2.348	11.7	4.437	22.2
20	38	3	2	1	1	5895.16	9.545	0.955	5905.66	20	0.373	0.019	7.722	38.6	6.642	33.2
21	45	1	1	1	0	4649.37	8.15	0.578	4658.1	10	0.009	0	3.411	17.1	3.02	15.1
22	45	5	6	1	0	5673.81	10.15	1.43	5685.39	30	0.386	0.016	9.789	48.9	9.789	48.9
23	35	0	3	0	0	4618.99	7.36	1.46	4627.81	7	0.16	0.008	3.423	17.1	3.423	17.1
24	30	3	3	1	0	5315.12	11.64	1.353	5328.11	15	0.009	0.001	6.343	31.7	6.313	31.6
25	31	1	4	0	1	5406	12.11	1.474	5419.58	5	0.351	0.021	5.894	29.5	5.002	25
26	41	2	1	1	1	4296	8.765	1.364	4306.13	1	0.064	0.003	3.264	16.3	3.215	16.1
27	33	1	1	1	0	3902.8	6.695	0.554	3910.05	0	0.043	0.002	2.059	10.3	2.059	10.3
28	34	2	0	1	0	4063.39	9.75	0.655	4073.79	1	0.002	0	3.478	17.4	3.478	17.4
29	36	1	1	1	0	4514.39	5.775	0.841	4521.01	14	0.482	0.031	2.928	14.6	2.928	14.6

Table B-2
Alternative 2 Results

30	28	1	2	0	0	4297.58	6.385	1.273	4305.23	4	0.244	0.014	3.281	16.4	3.281	16.4
31	43	2	2	0	1	4636.57	9.77	1.101	4647.44	4	0.127	0.005	4.122	20.6	3.072	15.4
32	34	2	4	0	1	5157.78	7.67	0.806	5166.26	8	0.238	0.011	5.435	27.2	5.329	26.6
33	37	3	1	1	1	4788.7	9.485	1.426	4799.61	10	0.05	0.003	3.659	18.3	3.578	17.9
34	31	1	3	1	0	5101.53	10.825	1.801	5114.15	15	0.392	0.024	4.96	24.8	4.96	24.8
35	36	1	1	1	1	4378.7	8.6	0.582	4387.88	2	0.264	0.013	3.699	18.5	3.124	15.6
36	47	0	5	0	1	5670.73	10.68	1.174	5682.58	13	0.373	0.015	7.568	37.8	6.848	34.2
37	24	0	4	1	1	5386.81	8.765	0.726	5396.3	20	0.623	0.047	11.624	58.1	9.592	48
38	46	1	0	0	0	3794.12	2.4	0.478	3797	1	0.005	0	0.589	2.9	0.589	2.9
39	43	3	2	1	0	4949.53	10.185	0.946	4960.66	4	0.125	0.006	4.926	24.6	6.049	30.2
40	22	1	1	0	1	3983.31	4.495	0.124	3987.93	3	0.232	0.022	2	10	1.688	8.4
41	44	4	2	0	1	4815.22	13.69	1.763	4830.68	10	0.466	0.017	6.081	30.4	4.453	22.3
42	38	1	3	0	1	4270.78	9.875	0.997	4281.65	11	0.295	0.014	4.679	23.4	4.252	21.3
43	31	3	3	0	1	4708.51	9.255	0.752	4718.51	12	0.104	0.006	4.438	22.2	3.518	17.6
44	40	2	1	0	0	4090.11	6	1.176	4097.28	4	0.182	0.007	2.524	12.6	2.524	12.6
45	40	1	1	1	1	4984.22	6.65	0.312	4991.18	3	0.079	0.004	2.514	12.6	1.68	8.4
46	38	4	1	0	1	4754.76	7.175	0.681	4762.61	2	0.002	0	2.898	14.5	1.777	8.9
47	37	0	2	0	1	4794.92	7.525	0.655	4803.1	9	0.537	0.032	4.904	24.5	4.904	24.5
48	56	1	2	0	0	4147.17	8.295	1.011	4156.48	10	0.554	0.018	3.751	18.8	3.751	18.8
49	43	1	4	1	1	5364.34	10.025	1.173	5375.54	17	0.451	0.025	7.983	39.9	7.409	37
50	39	2	3	0	1	4913.74	7.84	1.542	4923.12	11	0.607	0.028	4.975	24.9	4.928	24.6
51	35	2	2	1	1	4876.43	8.23	0.602	4885.26	10	0.001	0	4.987	24.9	4.107	20.5
52	53	2	2	0	1	4593.31	10.1	1.012	4604.42	16	0.376	0.014	4.677	23.4	3.759	18.8
53	34	1	1	0	0	4019.98	4.015	0.801	4024.8	7	0.377	0.023	1.928	9.6	1.928	9.6
54	41	0	3	1	0	4855.99	9.35	1.146	4866.49	17	0.053	0.003	4.92	24.6	4.92	24.6
55	35	4	1	0	1	5027.97	7.79	0.855	5036.61	10	0.538	0.024	3.839	19.2	2.993	15
56	45	1	1	1	0	4700.35	10.015	1.265	4711.63	15	0.072	0.003	4.465	22.3	4.465	22.3
57	46	0	1	0	0	4131.33	4.12	0.819	4136.27	5	0.227	0.01	2.051	10.3	2.051	10.3
58	31	1	0	1	0	4292.37	8.925	0.642	4301.94	10	0.011	0.001	4.036	20.2	4.036	20.2
59	36	1	0	0	0	3792.61	2.045	0.259	3794.91	2	0.072	0.003	0.595	3	0.595	3
60	41	1	3	0	1	4780.88	10.315	1.108	4792.3	8	0.161	0.006	4.723	23.6	3.81	19
61	29	0	1	0	0	4129.17	4.305	0.306	4133.78	1	0.53	0.032	2.677	13.4	2.677	13.4
62	45	2	2	0	0	3996.2	7.665	0.935	4004.8	11	0.041	0.002	2.731	13.7	2.731	13.7
63	43	1	2	1	0	5126.44	10.265	0.748	5137.45	7	0.14	0.008	6.321	31.6	7.699	38.5
64	39	2	1	0	0	4055.61	6.225	0.938	4062.78	5	0.459	0.025	2.443	12.2	2.443	12.2
65	31	4	3	1	0	5078.31	11.015	1.049	5090.38	15	0.06	0.004	5.178	25.9	5.178	25.9
66	31	2	3	1	1	4923.28	13.215	1.254	4937.75	3	0.288	0.016	6.066	30.3	5.554	27.8
67	38	2	1	1	0	4896.86	13.395	1.223	4911.48	2	0.058	0.003	2.815	14.1	6.886	34.4
68	41	3	0	0	1	4571.94	8.725	0.813	4581.48	3	0.028	0.001	3.014	15.1	1.61	8.1

Table B-2
Alternative 2 Results

69	45	3	2	1	0	4342.77	12.78	1.385	4356.93	6	0.143	0.006	5.002	25	5.002	25
70	54	4	2	1	0	4806.78	12.99	1.535	4821.3	12	0.359	0.011	5.405	27	5.405	27
71	33	1	2	0	1	4028.74	6.655	0.58	4035.98	8	0.001	0	2.148	10.7	1.188	5.9
72	41	3	3	1	0	5631.94	8.405	0.853	5641.2	15	0.267	0.015	8.707	43.5	8.707	43.5
73	30	1	1	0	1	5113.67	6.705	0.351	5120.73	0	0.001	0	2.311	11.6	0.36	1.8
74	40	2	3	1	0	4425.87	12.24	1.62	4439.73	4	0.044	0.002	4.628	23.1	4.628	23.1
75	37	2	4	1	1	5450.38	11.245	1.101	5462.73	7	0.043	0.002	5.401	27	4.397	22
76	37	2	3	1	0	4590.54	9.815	1.912	4602.27	8	0.314	0.013	4.761	23.8	4.761	23.8
77	36	0	3	0	1	5154.83	10.32	1.054	5166.2	9	0.276	0.014	5.136	25.7	3.736	18.7
78	34	1	2	1	0	5020.64	10.515	0.833	5031.99	5	0.221	0.018	5.887	29.4	6.897	34.5
79	36	2	3	1	0	4663.22	10.685	0.612	4674.52	10	0.46	0.027	6.026	30.1	6.246	31.2
80	46	2	0	1	1	5298.49	9.575	1.072	5309.13	10	0.044	0.002	6.292	31.5	5.372	26.9
81	36	3	2	0	0	4335.7	8.345	1.532	4345.57	7	0.296	0.014	3.722	18.6	3.722	18.6
82	33	0	0	0	1	3850.71	5.795	0.263	3856.77	0	0.001	0	1.731	8.7	0.219	1.1
83	40	3	2	1	0	5023.75	10.69	1.137	5035.58	14	0.604	0.027	6.641	33.2	6.641	33.2
84	33	1	3	0	1	5144.52	8.29	0.557	5153.37	4	0.083	0.004	3.979	19.9	2.188	10.9
85	39	1	1	1	1	4673.31	7.175	0.41	4680.89	10	0.002	0	5.46	27.3	4.048	20.2
86	39	1	3	0	1	5345.87	9.38	1.067	5356.31	13	0.12	0.005	6.382	31.9	6.15	30.7
87	38	2	0	1	0	4674.03	6.295	0.213	4680.54	10	0.001	0	1.9	9.5	1.684	8.4
88	48	1	0	0	0	3860.72	3.23	0.643	3864.59	0	0.008	0	0.889	4.4	0.889	4.4
89	37	3	0	1	0	4958.37	7.14	0.379	4965.89	10	0.131	0.008	3.966	19.8	3.92	19.6
90	36	2	2	0	0	4303.98	6.51	1.301	4311.8	3	0.655	0.029	3.078	15.4	3.078	15.4
91	40	1	6	0	1	4821.14	10.21	1.358	4832.7	17	0.75	0.039	5.59	27.9	5.23	26.1
92	38	2	2	1	1	5215.82	13.155	1.102	5230.08	9	0.072	0.004	5.8	29	6.238	31.2
93	46	2	3	1	1	4971.59	13.58	1.55	4986.72	17	0.146	0.006	5.727	28.6	4.63	23.1
94	32	3	0	1	1	4733.46	13.06	0.708	4747.23	4	0.001	0	2.878	14.4	4.186	20.9
95	29	3	0	0	0	3871.57	4.27	0.829	3876.66	0	0.026	0.001	1.251	6.3	1.251	6.3
96	38	3	1	0	1	4389.94	8.8	0.965	4399.7	5	0.188	0.009	3.793	19	3.234	16.2
97	29	1	0	1	0	4675.58	6.38	0.898	4682.86	10	0.001	0	2.176	10.9	2.176	10.9
98	53	5	0	0	0	4172.64	8.145	1.625	4182.41	6	0.147	0.005	2.812	14.1	2.812	14.1
99	46	0	1	1	1	5041.69	7.935	0.179	5049.81	0	0	0	3.026	15.1	1.488	7.4
100	35	2	1	0	1	5013.49	7.42	0.69	5021.6	7	0.26	0.013	3.195	16	2.476	12.4

Table B-3
Alternative 3 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	26	0	0	0	0	3749.73	0.02	0	3749.93	0	0	0	0.165	0.8	0.165	0.8
Max	54	5	6	1	1	4691.6	1.16	0.92	4692.52	31	1.974	0.099	12.361	61.8	9.267	46.3
Range	28	5	6	1	1	941.866	1.14	0.92	942.584	31	1.974	0.099	12.196	61	9.102	45.5
Mean	39.8	1.76	2.14	0.55	0.53	3947.45	0.57556	0.23415	3948.26	14.5918	0.20304	0.01064	6.17833	30.8908	4.40427	22.0184
St Dev	6.38	1.37	1.36	0.5	0.5	225.065	0.29604	0.16753	225.299	7.33763	0.32531	0.01758	2.91999	14.6002	1.98213	9.90994
RUN																
1	43	2	1	1	0	3773.28	0.199	0.125	3773.6	5	0.443	0.019	4.762	23.8	4.762	23.8
2	38	0	3	1	0	4061.8	0.891	0.176	4062.87	18	0.001	0	7.757	38.8	4.403	22
3	42	1	1	0	1	3826.17	0.503	0.129	3826.8	5	0.048	0.002	4.454	22.3	2.222	11.1
4	32	2	3	0	1	3780.62	0.317	0.195	3781.13	8	0.034	0.002	3.061	15.3	2.366	11.8
5	43	0	0	1	0	3786.08	0.227	0.223	3786.53	10	0.001	0	1.886	9.4	1.886	9.4
6	44	1	3	0	0	3758.8	0.175	0.173	3759.15	13	0.001	0	1.626	8.1	2.049	10.2
7	52	2	5	0	0	3789.79	0.332	0.327	3790.45	27	0.181	0.007	5.026	25.1	5.026	25.1
8	44	0	1	1	1	3878.45	0.665	0.297	3879.41	14	0.001	0	5.544	27.7	2.627	13.1
9	54	2	2	1	0	3834.1	0.507	0.47	3835.08	21	0.175	0.008	5.627	28.1	5.627	28.1
10	51	0	2	1	1	3911.48	0.788	0.249	3912.51	18	0.001	0	6.557	32.8	4.086	20.4
11	46	1	2	1	0	3858.78	0.553	0.129	3859.46	19	0.319	0.014	6.682	33.4	6.19	30.9
12	38	0	1	1	1	4042.88	0.678	0.674	4044.23	10	0	0	5.916	29.6	2.77	13.9
13	45	0	5	0	0	3783.48	0.388	0.371	3784.24	21	0.001	0	4.033	20.2	4.033	20.2
14	36	2	1	1	0	4223.52	0.964	0.099	4224.59	14	0.043	0.002	10.381	51.9	5.069	25.3
15	49	1	2	1	0	4145.56	0.907	0.124	4146.59	16	0.122	0.006	9.408	47	5.809	29
16	37	2	5	0	0	3791.3	0.358	0.354	3792.01	22	0.033	0.002	5.064	25.3	5.064	25.3
17	35	2	6	0	0	3789.51	0.521	0.452	3790.48	25	0.105	0.006	5.57	27.9	5.57	27.9
18	35	0	2	0	0	3763.93	0.148	0.127	3764.2	7	0.001	0	1.39	6.9	1.39	6.9
19	28	5	2	1	0	4317.76	0.852	0.171	4318.78	25	0.977	0.066	11.577	57.9	7.753	38.8
20	33	0	3	1	1	3781.07	0.41	0.173	3781.65	4	0	0	3.342	16.7	2.929	14.6
21	50	2	1	0	0	3768.86	0.134	0.1	3769.1	5	0.103	0.004	2.144	10.7	2.75	13.8
22	36	0	3	1	1	4367.22	1.16	0.175	4368.56	11	0	0	10.886	54.4	5.307	26.5
23	42	2	0	1	1	3902.19	0.733	0.272	3903.2	12	0.001	0	2.182	10.9	2.647	13.2
24	39	3	2	1	1	3871.97	0.481	0.173	3872.63	10	0.519	0.026	2.832	14.2	5.54	27.7
25	38	4	2	1	1	3947.2	0.794	0.346	3948.34	24	0.339	0.021	10.097	50.5	7.351	36.8
26	36	0	2	0	1	4401.65	0.858	0.149	4402.66	8	0.001	0	7.605	38	1.335	6.7
27	38	1	2	0	0	3749.73	0.103	0.099	3749.93	6	0	0	0.993	5	0.993	5
28	48	3	1	0	1	3876.55	0.553	0.153	3877.26	17	0.093	0.004	6.427	32.1	3.401	17

Table B-3
Alternative 3 Results

29	45	2	1	0	0	3760.78	0.154	0.148	3761.08	8	0.927	0.038	4.436	22.2	4.436	22.2
30	44	4	2	0	1	3791.76	0.412	0.278	3792.45	21	1.108	0.053	7.982	39.9	7.386	36.9
31	46	1	1	1	1	4004.86	0.766	0.074	4005.7	12	0.16	0.009	7.659	38.3	5.839	29.2
32	38	3	3	0	1	4503.43	1.092	0.075	4504.6	6	0.041	0.002	12.361	61.8	3.838	19.2
33	30	1	0	1	1	3928.43	0.578	0	3929.01	2	0.02	0.001	6.144	30.7	2.016	10.1
34	36	1	3	1	0	4292.4	1.029	0.25	4293.68	26	0.15	0.01	10.011	50.1	5.875	29.4
35	42	0	0	0	0	3755.18	0.02	0	3755.2	0	0.001	0	0.165	0.8	0.165	0.8
36	41	0	1	0	0	3778.84	0.079	0.074	3778.99	2	0.001	0	0.745	3.7	0.745	3.7
37	39	1	1	1	1	4421.79	0.834	0.074	4422.7	6	0.001	0	7.387	36.9	1.685	8.4
38	40	2	2	1	0	3878.13	0.586	0.127	3878.84	16	0.24	0.014	5.703	28.5	5.029	25.1
39	49	4	2	1	1	3945.25	0.831	0.272	3946.35	22	0.377	0.022	9.284	46.4	9.267	46.3
40	40	1	3	1	0	3791.02	0.448	0.248	3791.71	10	0.001	0	3.821	19.1	3.821	19.1
41	32	3	1	0	1	3935.77	0.632	0.051	3936.46	9	0.004	0	6.619	33.1	3.1	15.5
42	43	2	0	0	1	3989.47	0.61	0.05	3990.13	4	0.038	0.002	6.484	32.4	2.544	12.7
43	35	0	4	0	1	4545.09	1.077	0.198	4546.37	16	0	0	10.935	54.7	3.094	15.5
44	29	0	2	0	0	3762.33	0.205	0.2	3762.73	8	0	0	1.717	8.6	1.717	8.6
45	30	2	1	0	1	3869.62	0.514	0.025	3870.16	12	1.139	0.084	8.467	42.3	5.741	28.7
46	34	2	2	1	0	3847.51	0.394	0.372	3848.27	21	0.474	0.03	6.073	30.4	6.073	30.4
47	28	4	4	0	1	3817.9	0.549	0.332	3818.78	21	0.279	0.019	6.46	32.3	4.819	24.1
48	48	3	2	1	1	3795.98	0.38	0.346	3796.71	23	0.011	0.001	3.77	18.8	5.394	27
49	34	2	3	0	1	3988.42	0.863	0.248	3989.53	15	0.3	0.016	8.439	42.2	4.37	21.8
50	44	2	3	1	0	4028.67	0.93	0.241	4029.84	26	0.106	0.006	8.74	43.7	6.166	30.8
51	35	0	1	1	1	4059.93	0.759	0.747	4061.43	14	0.003	0	6.475	32.4	4.728	23.6
52	40	1	2	0	1	3801.84	0.389	0.124	3802.36	9	0.037	0.002	3.514	17.6	1.791	9
53	35	1	1	1	1	4077.4	0.929	0.198	4078.53	14	0.001	0	7.865	39.3	2.885	14.4
54	37	0	4	0	0	3763	0.299	0.299	3763.6	14	0.001	0	2.524	12.6	2.524	12.6
55	51	2	1	0	1	4023.5	0.858	0.176	4024.53	8	0.367	0.013	10.292	51.5	5.141	25.7
56	32	2	2	0	0	3760.7	0.22	0.148	3761.07	8	0.256	0.014	3.284	16.4	3.284	16.4
57	31	4	1	0	0	3765.23	0.166	0.159	3765.55	9	0.04	0.003	3.168	15.8	3.168	15.8
58	34	5	2	1	1	3770.88	0.336	0.199	3771.42	21	0.734	0.047	5.155	25.8	4.131	20.7
59	42	1	0	0	1	4453.65	1.069	0.029	4454.75	1	0.155	0.007	10.6	53	1.4	7
60	46	3	4	1	1	4332.07	0.934	0.291	4333.29	31	0.093	0.005	9.735	48.7	6.579	32.9
61	38	0	2	1	0	4346.9	0.981	0.124	4348.01	19	0	0	10.463	52.3	5.226	26.1
62	38	1	2	1	0	3973.72	0.774	0.148	3974.65	18	0	0	6.461	32.3	3.609	18
63	38	3	4	1	1	4165.59	0.845	0.203	4166.63	26	0.204	0.011	10.56	52.8	7.275	36.4
64	46	1	2	0	0	3779.28	0.297	0.225	3779.8	7	0.001	0	2.453	12.3	2.453	12.3
65	35	0	1	1	1	4691.6	0.871	0.049	4692.52	2	0.117	0.007	9.791	49	1.566	7.8
66	37	2	1	0	0	3762.68	0.058	0.049	3762.79	11	0.678	0.037	4.17	20.8	4.17	20.8

Table B-3
Alternative 3 Results

67	46	3	0	0	0	3776.14	0.148	0.132	3776.42	9	0.708	0.031	2.97	14.9	2.97	14.9
68	44	2	4	1	0	3785.12	0.473	0.322	3785.91	17	1.023	0.044	7.543	37.7	7.543	37.7
69	50	2	3	1	1	3840.28	0.698	0.446	3841.42	28	0.146	0.007	5.34	26.7	7.361	36.8
70	44	2	1	1	0	3916.4	0.567	0.569	3917.53	17	0	0	4.916	24.6	5.45	27.3
71	43	2	3	0	0	3770.43	0.21	0.199	3770.84	19	0.325	0.017	4.213	21.1	4.213	21.1
72	36	4	2	0	1	3835.22	0.472	0.153	3835.85	13	0.044	0.003	6.831	34.2	5.04	25.2
73	37	2	4	1	1	4022.12	1.033	0.525	4023.68	22	0.001	0	8.806	44	6.824	34.1
74	42	2	3	1	0	4346.26	1.043	0.183	4347.48	16	0.008	0	3.983	19.9	5.119	25.6
75	38	3	1	1	1	3820.44	0.401	0.075	3820.91	9	0.414	0.02	6.078	30.4	4.664	23.3
76	37	2	4	0	1	3773.22	0.39	0.341	3773.95	16	0.058	0.003	4.273	21.4	4.183	20.9
77	45	1	2	0	0	3760.76	0.232	0.228	3761.22	14	0.034	0.002	2.83	14.2	2.83	14.2
78	39	3	3	0	0	3796.07	0.278	0.272	3796.62	19	1.974	0.099	8.69	43.4	8.69	43.4
79	37	0	2	1	1	4188.63	0.788	0.124	4189.55	20	0.001	0	7.27	36.4	4.681	23.4
80	28	1	3	1	0	3893.78	0.708	0.594	3895.08	22	0	0	5.767	28.8	5.767	28.8
81	45	5	1	1	0	3818.57	0.476	0.472	3819.52	28	0.695	0.031	8.477	42.4	8.477	42.4
82	33	1	2	1	0	3767.45	0.275	0.199	3767.92	10	0.001	0	2.61	13.1	2.61	13.1
83	36	3	0	0	1	3859.12	0.466	0.074	3859.66	7	0.373	0.021	7.028	35.1	4.439	22.2
84	29	2	1	1	1	4208.77	0.771	0.044	4209.58	16	0.166	0.014	7.948	39.7	5.703	28.5
85	48	4	4	1	0	3821.24	0.418	0.414	3822.07	26	0.392	0.016	7.391	37	7.391	37
86	48	2	3	0	1	3790.17	0.407	0.402	3790.98	17	0.001	0	4.472	22.4	4.472	22.4
87	45	0	1	1	1	3822.74	0.513	0.151	3823.41	6	0.02	0.001	4.36	21.8	3.596	18
88	42	2	2	0	1	4053.47	0.815	0.148	4054.43	10	0.175	0.008	8.052	40.3	3.619	18.1
89	51	1	4	1	1	3919.95	0.831	0.445	3921.23	22	0.002	0	7.476	37.4	6.159	30.8
90	36	1	5	1	1	3900.5	0.942	0.625	3902.07	29	0.299	0.016	9.487	47.4	8.2	41
91	37	0	1	1	0	3888.21	0.613	0.1	3888.93	12	0	0	4.937	24.7	2.938	14.7
92	33	1	1	1	0	4278.16	1.047	0.124	4279.33	14	0	0	9.407	47	4.822	24.1
93	26	2	4	0	1	3831.59	0.517	0.178	3832.29	16	0.144	0.01	6.275	31.4	4.493	22.5
94	49	4	0	1	1	4481.01	1.068	0.92	4483	17	0.19	0.009	11.475	57.4	4.829	24.1
95	37	5	3	1	0	3779.49	0.389	0.322	3780.2	20	0.428	0.021	6.528	32.6	6.528	32.6
96	40	3	4	0	1	3981.14	0.888	0.287	3982.31	17	0.456	0.018	10.421	52.1	6.296	31.5
97	42	1	2	1	0	3774.38	0.298	0.099	3774.77	12	0.001	0	3.58	17.9	3.58	17.9
98	33	0	2	1	0	3768.63	0.258	0.201	3769.09	6	0.001	0	2.221	11.1	2.221	11.1
99	43	2	4	1	1	3889.57	0.817	0.35	3890.74	27	0.282	0.014	9.409	47	7.638	38.2
100	46	2	1	0	1	3782.31	0.278	0.174	3782.77	7	0.372	0.015	4.19	20.9	3.432	17.2

Table B-4
Alternative 4 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	26	0	0	0	0	3742.96	0.025	0	3743.01	0	0	0	0.205	1	0.205	1
Max	54	5	6	1	1	4694.66	1.169	0.577	4695.58	30	1.935	0.101	12.361	61.8	9.531	47.7
Range	28	5	6	1	1	951.699	1.144	0.577	952.573	30	1.935	0.101	12.156	60.8	9.326	46.7
Mean	39.8	1.76	2.14	0.55	0.53	3956.55	0.58741	0.22379	3957.36	14.3673	0.19687	0.01032	6.12836	30.6367	4.38351	21.9184
St Dev	6.38	1.37	1.36	0.5	0.5	231.954	0.28746	0.12462	232.168	7.15457	0.33142	0.0182	2.92499	14.626	1.97101	9.85682
RUN																
1	43	2	1	1	0	3767.65	0.202	0.129	3767.98	5	0.438	0.018	4.44	22.2	4.44	22.2
2	38	0	3	1	0	4059.69	0.915	0.185	4060.79	18	0.001	0	7.757	38.8	4.403	22
3	42	1	1	0	1	3820.03	0.518	0.163	3820.71	6	0.052	0.002	4.454	22.3	1.879	9.4
4	32	2	3	0	1	3769.2	0.337	0.215	3769.76	8	0.034	0.002	3.167	15.8	2.472	12.4
5	43	0	0	1	0	3799.93	0.245	0.241	3800.41	10	0.001	0	1.886	9.4	1.886	9.4
6	44	1	3	0	0	3749.35	0.215	0.214	3749.78	13	0.001	0	1.626	8.1	2.049	10.2
7	52	2	5	0	0	3771.35	0.339	0.334	3772.02	27	0.007	0	3.823	19.1	3.823	19.1
8	44	0	1	1	1	3879.84	0.686	0.333	3880.85	14	0.001	0	5.544	27.7	2.627	13.1
9	54	2	2	1	0	3866.14	0.536	0.504	3867.18	21	0.083	0.004	5.869	29.3	5.869	29.3
10	51	0	2	1	1	3922.82	0.801	0.242	3923.86	18	0.001	0	6.557	32.8	4.086	20.4
11	46	1	2	1	0	3851.43	0.554	0.135	3852.12	19	0.319	0.014	6.668	33.3	6.175	30.9
12	38	0	1	1	1	4152.12	0.678	0.274	4153.07	10	0	0	5.916	29.6	2.77	13.9
13	45	0	5	0	0	3795.39	0.393	0.391	3796.18	21	0.001	0	4.033	20.2	4.033	20.2
14	36	2	1	1	0	4217.85	0.968	0.103	4218.92	14	0.043	0.002	10.35	51.8	5.039	25.2
15	49	1	2	1	0	4156.98	0.887	0.104	4157.97	16	0.122	0.006	9.248	46.2	5.809	29
16	37	2	5	0	0	3787.67	0.381	0.376	3788.42	22	0.045	0.002	5.202	26	5.202	26
17	35	2	6	0	0	3787.38	0.538	0.45	3788.37	25	0.104	0.006	5.511	27.6	5.511	27.6
18	35	0	2	0	0	3754.01	0.172	0.171	3754.35	7	0.001	0	1.39	6.9	1.39	6.9
19	28	5	2	1	0	4327.79	0.86	0.176	4328.82	24	0.977	0.066	11.584	57.9	7.959	39.8
20	33	0	3	1	1	3786.45	0.412	0.175	3787.04	4	0	0	3.342	16.7	2.929	14.6
21	50	2	1	0	0	3755.6	0.165	0.132	3755.9	5	0.12	0.004	2.529	12.6	3.136	15.7
22	36	0	3	1	1	4371.02	1.169	0.183	4372.37	11	0	0	10.886	54.4	5.307	26.5
23	42	2	0	1	1	3918.32	0.733	0.272	3919.32	12	0.001	0	2.182	10.9	2.647	13.2
24	39	3	2	1	1	3845.2	0.491	0.198	3845.89	12	0.108	0.006	2.263	11.3	4.971	24.9
25	38	4	2	1	1	4123.4	0.853	0.188	4124.44	17	0.122	0.006	10.097	50.5	6.266	31.3
26	36	0	2	0	1	4406.29	0.859	0.15	4407.29	8	0.001	0	7.605	38	1.335	6.7
27	38	1	2	0	0	3748.68	0.129	0.125	3748.93	6	0	0	0.993	5	0.993	5
28	48	3	1	0	1	3879.08	0.577	0.178	3879.83	17	0.093	0.004	6.427	32.1	3.401	17

Table B-4
Alternative 4 Results

29	45	2	1	0	0	3760.84	0.171	0.166	3761.18	8	1.006	0.041	4.514	22.6	4.514	22.6
30	44	4	2	0	1	3781.3	0.413	0.29	3782.01	21	1.209	0.058	8.035	40.2	7.439	37.2
31	46	1	1	1	1	4008.33	0.787	0.094	4009.21	11	0.119	0.006	7.659	38.3	5.839	29.2
32	38	3	3	0	1	4498.56	1.121	0.103	4499.78	6	0.041	0.002	12.361	61.8	3.838	19.2
33	30	1	0	1	1	3928.43	0.578	0	3929.01	2	0.02	0.001	6.144	30.7	2.016	10.1
34	36	1	3	1	0	4307.87	1.015	0.235	4309.12	26	0.108	0.007	10.051	50.3	5.913	29.6
35	42	0	0	0	0	3742.96	0.025	0.025	3743.01	0	0.001	0	0.205	1	0.205	1
36	41	0	1	0	0	3753.77	0.099	0.094	3753.96	2	0.001	0	0.745	3.7	0.745	3.7
37	39	1	1	1	1	4412.92	0.859	0.1	4413.88	6	0.001	0	7.467	37.3	1.685	8.4
38	40	2	2	1	0	3865.38	0.626	0.148	3866.16	16	0.24	0.014	5.769	28.8	5.095	25.5
39	49	4	2	1	1	3925.73	0.87	0.313	3926.91	22	0.465	0.027	9.548	47.7	9.531	47.7
40	40	1	3	1	0	3788.45	0.474	0.274	3789.2	10	0.001	0	3.821	19.1	3.821	19.1
41	32	3	1	0	1	3931.81	0.638	0.057	3932.5	9	0.004	0	6.619	33.1	3.1	15.5
42	43	2	0	0	1	3984.74	0.629	0.069	3985.43	4	0.038	0.002	6.484	32.4	2.544	12.7
43	35	0	4	0	1	4548.07	1.088	0.209	4549.37	16	0	0	10.935	54.7	3.094	15.5
44	29	0	2	0	0	3763.05	0.211	0.206	3763.46	8	0	0	1.717	8.6	1.717	8.6
45	30	2	1	0	1	3850.15	0.53	0.059	3850.74	13	1.329	0.101	8.561	42.8	5.858	29.3
46	34	2	2	1	0	3881.16	0.4	0.396	3881.95	21	0.474	0.03	6.073	30.4	6.073	30.4
47	28	4	4	0	1	3804.55	0.604	0.392	3805.54	21	0.233	0.016	6.46	32.3	4.819	24.1
48	48	3	2	1	1	3805.93	0.405	0.372	3806.71	23	0.011	0.001	3.77	18.8	5.394	27
49	34	2	3	0	1	3999.27	0.803	0.191	4000.26	16	0.329	0.018	8.719	43.6	4.69	23.4
50	44	2	3	1	0	4034.31	0.962	0.261	4035.53	26	0.106	0.006	8.887	44.4	6.312	31.6
51	35	0	1	1	1	4144.38	0.77	0.318	4145.47	14	0.003	0	6.465	32.3	4.718	23.6
52	40	1	2	0	1	3793.21	0.412	0.147	3793.77	9	0.037	0.002	3.514	17.6	1.791	9
53	35	1	1	1	1	4074.3	0.909	0.178	4075.38	14	0.001	0	7.721	38.6	2.82	14.1
54	37	0	4	0	0	3775.13	0.305	0.305	3775.74	14	0.001	0	2.524	12.6	2.524	12.6
55	51	2	1	0	1	4025.78	0.892	0.213	4026.88	8	0.302	0.01	10.197	51	5.114	25.6
56	32	2	2	0	0	3757.28	0.23	0.173	3757.68	8	0.256	0.014	3.284	16.4	3.284	16.4
57	31	4	1	0	0	3758.68	0.216	0.212	3759.11	9	0.053	0.003	3.46	17.3	3.46	17.3
58	34	5	2	1	1	3767.96	0.338	0.2	3768.5	22	0.246	0.016	4.528	22.6	3.504	17.5
59	42	1	0	0	1	4453.68	1.087	0.046	4454.81	1	0.155	0.007	10.6	53	1.4	7
60	46	3	4	1	1	4334.97	0.926	0.283	4336.18	30	0.361	0.021	9.583	47.9	6.507	32.5
61	38	0	2	1	0	4337.74	0.989	0.128	4338.86	19	0	0	10.493	52.5	5.256	26.3
62	38	1	2	1	0	3966.25	0.787	0.154	3967.2	18	0	0	6.461	32.3	3.609	18
63	38	3	4	1	1	4183.85	0.799	0.168	4184.82	26	0.194	0.011	10.56	52.8	7.269	36.3
64	46	1	2	0	0	3765.55	0.297	0.234	3766.08	7	0.001	0	2.453	12.3	2.453	12.3
65	35	0	1	1	1	4694.66	0.89	0.034	4695.58	2	0.074	0.004	9.791	49	1.561	7.8
66	37	2	1	0	0	3758.55	0.084	0.08	3758.72	11	0.686	0.038	4.45	22.2	4.45	22.2

Table B-4
Alternative 4 Results

67	46	3	0	0	0	3767.91	0.185	0.18	3768.27	9	0.74	0.032	2.923	14.6	2.923	14.6
68	44	2	4	1	0	3788.08	0.476	0.325	3788.88	17	1.023	0.044	7.543	37.7	7.543	37.7
69	50	2	3	1	1	3864.31	0.712	0.45	3865.47	28	0.146	0.007	5.318	26.6	7.138	35.7
70	44	2	1	1	0	3981.16	0.575	0.577	3982.31	16	0	0	4.669	23.3	5.203	26
71	43	2	3	0	0	3760.72	0.218	0.213	3761.15	19	0.416	0.021	4.311	21.6	4.311	21.6
72	36	4	2	0	1	3818.65	0.504	0.195	3819.35	11	0.137	0.008	6.668	33.3	5.018	25.1
73	37	2	4	1	1	4167.48	0.725	0.118	4168.32	21	0.266	0.015	8.887	44.4	7.142	35.7
74	42	2	3	1	0	4347.58	1.047	0.179	4348.81	16	0.012	0	4.053	20.3	5.124	25.6
75	38	3	1	1	1	3817.58	0.43	0.105	3818.11	9	0.376	0.018	6.04	30.2	4.626	23.1
76	37	2	4	0	1	3772.9	0.422	0.373	3773.7	16	0.058	0.003	4.255	21.3	4.165	20.8
77	45	1	2	0	0	3767.56	0.261	0.256	3768.08	14	0.036	0.002	3.23	16.2	3.23	16.2
78	39	3	3	0	0	3800.27	0.303	0.301	3800.88	19	1.935	0.097	8.656	43.3	8.656	43.3
79	37	0	2	1	1	4187.18	0.804	0.141	4188.13	18	0.001	0	7.032	35.2	4.641	23.2
80	28	1	3	1	0	3986.7	0.713	0.391	3987.81	18	0	0	4.883	24.4	5.792	29
81	45	5	1	1	0	3825.29	0.529	0.532	3826.35	28	0.783	0.035	8.749	43.7	8.749	43.7
82	33	1	2	1	0	3768.15	0.285	0.208	3768.64	10	0.001	0	2.61	13.1	2.61	13.1
83	36	3	0	0	1	3839.84	0.47	0.094	3840.41	7	0.426	0.024	7.081	35.4	4.608	23
84	29	2	1	1	1	4193.99	0.782	0.07	4194.84	16	0.166	0.014	7.948	39.7	5.703	28.5
85	48	4	4	1	0	3852.84	0.475	0.47	3853.78	26	0.308	0.012	7.508	37.5	7.508	37.5
86	48	2	3	0	1	3791.57	0.453	0.448	3792.47	17	0.007	0	4.706	23.5	4.706	23.5
87	45	0	1	1	1	3817.67	0.538	0.175	3818.38	6	0.026	0.001	4.36	21.8	3.596	18
88	42	2	2	0	1	4051.06	0.815	0.148	4052.02	10	0.175	0.008	8.052	40.3	3.619	18.1
89	51	1	4	1	1	4021.78	0.828	0.205	4022.81	17	0.002	0	4.487	22.4	5.812	29.1
90	36	1	5	1	1	3992.8	0.959	0.532	3994.29	29	0.001	0	8.921	44.6	7.392	37
91	37	0	1	1	0	3894.87	0.612	0.079	3895.56	12	0	0	4.937	24.7	2.938	14.7
92	33	1	1	1	0	4291.34	1.042	0.104	4292.49	14	0	0	9.407	47	4.822	24.1
93	26	2	4	0	1	3829.45	0.552	0.214	3830.21	16	0.193	0.014	6.363	31.8	4.581	22.9
94	49	4	0	1	1	4571.74	1.072	0.349	4573.16	14	0.19	0.009	11.025	55.1	4.379	21.9
95	37	5	3	1	0	3779.46	0.427	0.355	3780.24	20	0.428	0.021	6.52	32.6	6.52	32.6
96	40	3	4	0	1	3974.25	0.909	0.308	3975.46	17	0.449	0.018	10.776	53.9	6.651	33.3
97	42	1	2	1	0	3774.26	0.328	0.13	3774.71	12	0.001	0	3.58	17.9	3.58	17.9
98	33	0	2	1	0	3766.1	0.27	0.223	3766.59	6	0.001	0	2.221	11.1	2.221	11.1
99	43	2	4	1	1	3901.52	0.834	0.347	3902.7	27	0.29	0.014	9.409	47	7.638	38.2
100	46	2	1	0	1	3763.08	0.276	0.182	3763.54	7	0.357	0.014	3.671	18.4	2.913	14.6

Table B-5
Alternative 5 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	25	0	0	0	0	3873.99	3.945	0.151	3882.57	0	0	0	1.169	5.8	0	0
Max	56	5	6	1	1	6381.32	21.925	3.479	6391.95	23	1.053	0.055	13.153	65.8	8.587	42.9
Range	31	5	6	1	1	2507.33	17.98	3.328	2509.38	23	1.053	0.055	11.984	60	8.587	42.9
Mean	39.1	1.91	1.98	0.44	0.5	4850.9	13.4381	1.72516	4866.07	6.5	0.21079	0.00993	6.90759	34.5367	3.57204	17.8561
St Dev	6.59	1.27	1.42	0.5	0.5	613.112	3.59118	0.78277	613.966	5.9198	0.22776	0.01134	2.65945	13.2979	2.05562	10.2786
RUN																
1	43	2	1	1	0	4077.5	14.29	2.49	4094.28	0	0.001	0	4.901	24.5	1.775	8.9
2	33	0	3	1	0	4951.63	14.57	1.594	4967.79	15	0.247	0.018	9.022	45.1	6.956	34.8
3	34	2	3	0	0	4274.71	12.785	1.823	4289.32	8	0.23	0.012	6.111	30.6	3.891	19.5
4	48	2	5	0	1	5487.28	20.055	2.534	5509.87	9	0.258	0.009	9.85	49.3	3.138	15.7
5	43	1	3	0	1	4788.81	17.045	1.913	4807.77	3	0.301	0.011	8.431	42.2	2.734	13.7
6	46	2	6	0	1	5040.11	18.79	1.95	5060.85	19	0.368	0.012	10.773	53.9	5.841	29.2
7	50	2	1	0	0	4328.2	14.665	2.128	4344.99	1	0.004	0	5.974	29.9	1.457	7.3
8	36	1	1	1	0	4143.15	12.155	1.32	4156.63	0	0	0	4.622	23.1	2.204	11
9	35	1	2	1	1	6381.32	10.265	0.362	6391.95	10	0	0	11.767	58.8	4.925	24.6
10	43	2	4	0	0	4595.19	17.325	2.523	4615.03	9	0.284	0.011	8.141	40.7	3.148	15.7
11	46	2	2	1	0	4505.37	12.115	1.837	4519.32	18	0.055	0.003	5.911	29.6	3.663	18.3
12	45	2	2	0	1	4014.05	10.055	1.656	4025.76	8	0.001	0	2.962	14.8	1.937	9.7
13	37	0	0	0	1	5148.78	7.81	0.255	5156.85	0	0.001	0	2.877	14.4	0	0
14	35	3	3	1	1	6343.83	14.43	1.203	6359.46	15	0.49	0.022	8.537	42.7	5.067	25.3
15	45	3	3	0	0	4839.21	14.745	2.94	4856.89	12	0.336	0.012	9.014	45.1	3.829	19.1
16	40	2	5	1	1	5759.73	14.405	1.617	5775.76	23	0.705	0.036	12.901	64.5	6.907	34.5
17	34	1	4	0	0	4460.56	14.53	2.423	4477.51	7	0.454	0.022	6.746	33.7	4.886	24.4
18	49	3	3	1	0	4586.3	16.385	1.937	4604.62	11	1	0.044	3.303	16.5	6.346	31.7
19	39	3	5	0	0	4822.42	18.535	2.731	4843.69	13	0.531	0.024	9.783	48.9	4.068	20.3
20	53	4	1	1	1	5437.71	11.045	2.047	5450.81	11	0.425	0.017	10.623	53.1	6.416	32.1
21	45	0	4	0	0	4862.93	14.545	2.885	4880.36	8	0.327	0.013	8.807	44	3.778	18.9
22	30	1	2	1	1	5957.7	13.13	1.292	5972.13	0	0.111	0.006	11.026	55.1	2.561	12.8
23	36	0	5	1	0	5524.84	12.555	1.219	5538.61	12	0.384	0.025	11.653	58.3	8.587	42.9
24	40	5	0	1	1	5420.77	15.955	0.911	5437.63	1	0.06	0.003	7.887	39.4	3.312	16.6
25	40	2	1	1	0	4320.02	12.64	1.609	4334.27	13	0.231	0.012	6.423	32.1	3.851	19.3
26	42	1	2	0	1	4472.17	16.455	2.582	4491.21	0	0.064	0.003	7.664	38.3	2.327	11.6
27	45	2	2	0	0	4492.72	12.93	2.562	4508.21	4	0.276	0.011	6.387	31.9	4.312	21.6
28	28	0	0	1	1	4820.97	8.325	0.151	4829.45	0	0	0	3.259	16.3	0.109	0.5

Table B-5
Alternative 5 Results

29	26	3	0	1	0	4202.09	11.085	1.831	4215	10	0.014	0.001	4.749	23.7	2.768	13.8
30	36	1	3	1	0	4549.18	15.335	1.866	4566.38	12	0.118	0.006	7.303	36.5	4.517	22.6
31	42	0	2	0	1	5734.18	12.49	1.174	5747.84	1	0.093	0.004	5.564	27.8	1.825	9.1
32	49	4	1	0	1	4444.29	18.46	2.592	4465.34	3	0.331	0.011	8.053	40.3	3.375	16.9
33	29	1	2	1	0	4595	16.12	2.289	4613.41	5	0.331	0.023	6.128	30.6	7.322	36.6
34	35	2	3	0	1	5432.33	12.475	1.215	5446.02	14	1.053	0.055	7.865	39.3	5.425	27.1
35	37	3	0	0	0	4149.47	11.27	2.239	4162.98	0	0.001	0	4.12	20.6	0.75	3.8
36	37	3	3	0	1	5361.06	16.165	1.56	5378.79	3	0.436	0.018	9.123	45.6	2.342	11.7
37	32	1	1	0	1	5630.96	9.335	0.412	5640.71	0	0.001	0	4.31	21.5	0	0
38	49	1	0	1	0	4328.24	8.35	0.597	4337.19	0	0	0	1.169	5.8	4.224	21.1
39	51	2	2	1	1	4830.51	14.55	1.801	4846.86	16	0.323	0.016	9.572	47.9	6.507	32.5
40	35	0	1	0	1	5353.08	11.495	0.773	5365.35	0	0.001	0	4.912	24.6	0.366	1.8
41	42	2	2	0	0	4340.89	14.06	1.787	4356.73	3	0.134	0.006	7.013	35.1	3.662	18.3
42	41	2	0	1	1	5101.43	12.7	2.195	5116.33	10	0.03	0.002	8.722	43.6	4.427	22.1
43	48	2	0	1	0	3986.94	12.005	1.834	4000.78	0	0.023	0.001	4.03	20.2	1.81	9.1
44	32	2	0	1	0	4615.19	10.98	0.783	4626.96	10	0	0	6.721	33.6	4.575	22.9
45	41	1	0	0	1	4372.43	8.37	0.378	4381.17	0	0.001	0	3.074	15.4	0	0
46	38	1	2	0	0	4154.68	12.045	2.294	4169.02	4	0.255	0.012	5.08	25.4	3.074	15.4
47	36	4	2	1	1	5026.99	16.73	3.073	5046.79	13	0.226	0.011	10.326	51.6	7.654	38.3
48	46	4	3	0	0	4182.25	13.325	2.171	4197.74	6	0.132	0.005	5.066	25.3	3.267	16.3
49	40	2	2	1	0	5577.27	17.48	3.479	5598.23	10	0.234	0.009	11.519	57.6	6.712	33.6
50	36	1	1	0	0	4195.04	9.945	1.789	4206.78	0	0.032	0.001	4.438	22.2	1.2	6
51	37	2	0	0	0	3971.61	8.095	1.602	3981.31	0	0.001	0	2.917	14.6	0.548	2.7
52	37	1	3	0	0	4205.58	10.315	2.038	4217.94	9	0.483	0.022	5.353	26.8	3.958	19.8
53	32	2	1	0	1	5232.12	16.14	1.569	5249.83	0	0.355	0.017	7.568	37.8	2.357	11.8
54	44	2	2	1	0	4635.33	17.29	2.288	4654.9	14	0.006	0	8.522	42.6	5.737	28.7
55	33	4	4	0	0	4451.55	14.97	2.704	4469.23	9	0.382	0.016	6.344	31.7	4.423	22.1
56	43	2	2	1	1	4459.12	12.89	1.387	4473.4	5	0.155	0.006	5.155	25.8	2.633	13.2
57	37	3	1	0	1	5065.75	12.96	1.194	5079.9	0	0.087	0.004	5.433	27.2	1.628	8.1
58	31	1	2	1	1	5829.31	14.91	1.707	5845.93	18	0.411	0.028	9.494	47.5	6.087	30.4
59	41	1	2	1	1	5305.2	15.975	3.1	5324.28	15	0.064	0.004	10.236	51.2	6.993	35
60	42	1	1	0	0	4091.05	11.43	2.265	4104.74	3	0.355	0.015	4.625	23.1	2.262	11.3
61	29	4	1	1	0	4802.29	21.925	2.61	4826.83	0	0.338	0.02	9.965	49.8	5.953	29.8
62	40	0	1	1	0	4576.44	10.79	1.201	4588.43	1	0.069	0.004	3.048	15.2	5.612	28.1
63	40	2	3	1	1	4994.54	10.545	2.106	5007.19	13	0.145	0.009	7.836	39.2	4.684	23.4
64	32	1	3	0	1	5408.51	12.255	0.864	5421.63	5	0.206	0.013	6.81	34	2.905	14.5
65	32	4	1	0	1	5481.1	13.645	1.582	5496.32	4	0.32	0.015	6.319	31.6	1.656	8.3
66	39	5	0	1	0	5044.99	12.585	1.587	5059.16	12	0	0	9.218	46.1	7.099	35.5

Table B-5
Alternative 5 Results

67	39	1	0	1	0	3996.72	8.99	0.724	4006.43	0	0	0	3.305	16.5	2.421	12.1
68	41	0	3	0	1	5723.2	15.51	1.874	5740.58	9	0.262	0.01	7.509	37.5	2.741	13.7
69	34	3	2	0	0	4474.37	12.955	1.634	4488.96	4	0.727	0.033	7.444	37.2	4.801	24
70	56	1	3	0	1	4852.59	14.94	1.605	4869.14	12	0.667	0.023	9.035	45.2	4.523	22.6
71	31	0	1	0	0	3905.03	3.945	0.775	3909.75	1	0.121	0.008	1.756	8.8	1.36	6.8
72	36	3	1	0	1	5697.46	14.295	1.494	5713.25	0	0.001	0	6.413	32.1	0.659	3.3
73	25	2	2	0	1	6134.41	13.955	1.142	6149.51	3	0.491	0.033	7.21	36	3.934	19.7
74	33	1	2	1	0	5515.52	21.03	2.197	5538.75	5	0.684	0.045	13.153	65.8	7.782	38.9
75	32	2	4	0	1	5047.63	15.26	1.821	5064.71	7	0.217	0.011	7.835	39.2	4.266	21.3
76	55	2	2	0	0	3979.88	13.43	2.324	3995.63	10	0.061	0.002	4.311	21.6	1.673	8.4
77	35	5	2	0	0	4411.14	16.52	2.857	4430.52	4	0.104	0.004	7.01	35.1	2.68	13.4
78	39	2	2	1	1	5205.56	21.515	2.731	5229.81	13	0.204	0.009	10.107	50.5	5.568	27.8
79	48	2	3	0	0	4518.04	15.015	2.955	4536.01	8	0.525	0.019	7.209	36	4.013	20.1
80	36	2	1	1	0	4435.81	14.06	2.386	4452.26	15	0.005	0	6.026	30.1	4.656	23.3
81	30	1	0	0	0	3983.61	4.48	0.871	3988.96	0	0	0	1.794	9	0.669	3.3
82	38	2	4	1	1	4929.74	13.855	2.527	4946.12	22	0.253	0.013	10.246	51.2	8.016	40.1
83	35	1	2	0	1	4680.84	14.955	1.815	4697.61	7	0.254	0.012	7.039	35.2	2.886	14.4
84	41	5	3	0	0	4298.97	15.425	2.906	4317.3	10	0.291	0.011	6.644	33.2	3.986	19.9
85	33	4	1	0	1	4973.27	10.845	0.59	4984.7	4	0.001	0	5.017	25.1	1.633	8.2
86	48	1	4	0	0	4757.97	12.425	2.463	4772.86	5	0.03	0.001	7.151	35.8	2.043	10.2
87	34	2	2	1	1	5268	7.87	0.19	5276.06	10	0	0	6.263	31.3	4.205	21
88	29	2	2	1	1	5179.19	21.065	1.995	5202.25	1	0.029	0.002	10.255	51.3	1.806	9
89	53	2	4	0	0	4897.05	13.38	2.663	4913.09	1	0.156	0.005	7.495	37.5	3.357	16.8
90	43	3	3	0	0	4511.18	13.03	2.056	4526.27	14	0.549	0.022	7.577	37.9	5.219	26.1
91	40	2	2	1	1	5028.67	20.195	1.407	5050.27	4	0.019	0.001	8.688	43.4	3.867	19.3
92	43	0	1	1	0	4094.76	9.425	0.4	4104.59	0	0.001	0	3.567	17.8	2.98	14.9
93	37	2	0	1	1	5623.15	9.645	0.767	5633.57	0	0.503	0.028	8.356	41.8	2.864	14.3
94	38	2	2	0	1	5511.25	10.375	0.498	5522.12	0	0.001	0	5.709	28.5	0.621	3.1
95	42	1	0	1	0	3873.99	7.29	1.286	3882.57	0	0.001	0	2.374	11.9	0.42	2.1
96	30	1	1	0	1	5693.96	10.005	0.498	5704.47	4	0.001	0	3.839	19.2	1.023	5.1
97	44	0	4	0	1	4187.3	9.875	0.597	4197.77	4	0.105	0.004	4.867	24.3	3.088	15.4
98	35	3	2	1	1	5754.43	12.575	0.964	5767.97	13	0.177	0.008	7.895	39.5	3.983	19.9
99	43	3	0	0	0	4066.89	12.725	1.979	4081.59	0	0.011	0	4.423	22.1	1.279	6.4
100	40	0	3	1	1	5630.29	20.905	1.729	5652.92	4	0.164	0.007	10.29	51.4	5.407	27

Table B-6
Alternative 6 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	21	0	0	0	0	3876.89	5.895	0.06	3884.61	0	0	0	0.954	4.8	0	0
Max	57	7	5	1	1	6863.06	15.61	1.932	6874.72	17	0.828	0.033	12.062	60.3	8.268	41.3
Range	36	7	5	1	1	2986.18	9.715	1.872	2990.11	17	0.828	0.033	11.108	55.5	8.268	41.3
Mean	39.1	2.04	1.96	0.44	0.45	5239.92	10.8199	0.99693	5251.73	4.86735	0.13769	0.00659	5.95001	29.7531	2.84241	14.2112
St Dev	7	1.42	1.24	0.5	0.5	621.26	2.19379	0.39096	622.046	5.0234	0.17637	0.00833	2.19442	10.9714	1.8144	9.07061
RUN																
1	43	2	1	1	0	4367.28	11.55	1.615	4380.45	0	0.001	0	3.979	19.9	1.518	7.6
2	33	0	3	1	0	5923.3	11.255	0.935	5935.49	13	0.055	0.004	9.63	48.1	6.457	32.3
3	28	3	2	1	0	5140.01	13.12	0.963	5154.09	4	0	0	2.546	12.7	4.576	22.9
4	36	3	2	1	0	5943.01	13.235	0.402	5956.64	1	0.073	0.005	9.192	46	3.723	18.6
5	34	2	0	0	0	4196.47	5.915	1.179	4203.57	0	0.036	0.002	1.986	9.9	0.76	3.8
6	57	4	3	1	0	5670.6	14.575	1.181	5686.35	7	0.503	0.016	8.898	44.5	4.658	23.3
7	37	2	3	1	0	6231.21	11.805	1.338	6244.35	3	0.324	0.013	7.694	38.5	2.589	12.9
8	48	4	3	0	0	5711.52	10.145	1.326	5722.99	4	0.001	0	5.244	26.2	1.616	8.1
9	29	0	2	1	0	3979.97	7.245	0.435	3987.65	2	0.005	0	2.852	14.3	2.136	10.7
10	34	3	0	1	0	5417.7	10.775	1.481	5429.96	10	0.001	0	6.04	30.2	4.254	21.3
11	37	1	2	0	0	4925.95	10.335	1.342	4937.63	8	0.157	0.009	5.85	29.3	3.34	16.7
12	32	4	5	1	0	5401.57	9.27	0.501	5411.34	15	0.381	0.033	9.998	50	8.268	41.3
13	24	1	0	0	1	4747.73	6.335	0.06	4754.12	0	0	0	2.382	11.9	0.078	0.4
14	36	1	2	0	0	4419.11	11.115	0.956	4431.18	0	0.008	0	5.202	26	0.85	4.2
15	43	0	1	0	0	4215.15	5.895	1.176	4222.22	2	0.258	0.012	2.575	12.9	1.856	9.3
16	30	3	1	0	1	4992.97	13.925	1.121	5008.02	0	0.027	0.001	5.892	29.5	0.757	3.8
17	34	2	2	0	1	5113.73	9.99	0.621	5124.34	0	0.174	0.008	5.351	26.8	1.702	8.5
18	42	2	1	0	0	5169.42	9.94	1.337	5180.7	0	0.025	0.001	5.041	25.2	1.722	8.6
19	32	4	2	1	0	6257.47	12.865	0.988	6271.32	12	0.001	0	9.546	47.7	3.81	19
20	42	0	3	0	1	5458.04	7.725	0.334	5466.1	10	0.416	0.019	4.159	20.8	2.5	12.5
21	35	0	1	1	0	4451.86	11.77	0.747	4464.38	4	0	0	0.954	4.8	4.963	24.8
22	31	2	1	0	1	4198.17	8.81	1.123	4208.11	2	0.142	0.008	3.691	18.5	1.334	6.7
23	40	2	1	0	1	5896.86	12.595	1.024	5910.47	0	0.001	0	6.361	31.8	0.44	2.2
24	45	2	3	0	1	5762.69	12	1.412	5776.11	1	0.828	0.03	8.402	42	3.912	19.6
25	47	0	2	0	0	4232.44	9.455	0.695	4242.59	0	0.001	0	4.444	22.2	1.558	7.8
26	40	3	2	1	0	4829.78	11.715	1.372	4842.86	15	0.326	0.016	5.167	25.8	3.73	18.6
27	38	7	1	0	1	4969.65	13.63	1.309	4984.59	8	0.32	0.014	7.143	35.7	3.686	18.4
28	29	5	0	0	1	4562.02	12.485	1.454	4575.96	0	0.012	0.001	4.886	24.4	1.511	7.6

Table B-6
Alternative 6 Results

29	44	1	4	1	0	5883.44	12.445	1.567	5897.46	5	0.352	0.013	7.359	36.8	3.788	18.9
30	37	1	2	1	0	4816.85	8.605	0.64	4826.09	12	0.149	0.008	7.055	35.3	4.844	24.2
31	51	1	3	0	0	5485.18	11.62	1.29	5498.09	4	0.187	0.006	7.333	36.7	3.509	17.5
32	45	1	3	0	1	5055.1	11.855	0.859	5067.82	4	0.717	0.028	7.034	35.2	3.964	19.8
33	38	2	0	0	0	4215.6	8.88	1.239	4225.72	0	0.001	0	2.863	14.3	0.32	1.6
34	50	2	4	0	0	5467.55	9.9	1.314	5478.76	5	0.246	0.008	5.923	29.6	2.609	13
35	42	3	1	1	0	4598.37	12.455	0.606	4611.43	0	0.001	0	5.097	25.5	3.218	16.1
36	38	3	3	0	1	5378.11	10.85	1.03	5389.99	10	0.018	0.001	6.223	31.1	3.234	16.2
37	46	1	1	1	0	5398.46	9.01	0.743	5408.21	0	0.125	0.006	7.997	40	4.996	25
38	37	0	2	0	1	5541.73	11.135	0.659	5553.52	6	0.272	0.013	6.135	30.7	2.342	11.7
39	45	1	1	0	0	4980.35	8.405	1.156	4989.91	0	0.001	0	4.044	20.2	0.048	0.2
40	23	1	2	0	1	4888.34	6.68	0.211	4895.23	1	0.382	0.027	3.994	20	2.349	11.7
41	44	4	2	0	1	5593.35	14.885	1.411	5609.65	2	0.139	0.005	7.815	39.1	2.504	12.5
42	38	1	3	0	1	4556.53	10.705	1.048	4568.28	9	0.213	0.01	5.299	26.5	4.004	20
43	31	3	3	0	1	5346.02	11.17	0.548	5357.74	4	0.001	0	6.571	32.9	1.699	8.5
44	40	2	1	0	0	4553.35	10.275	1.736	4565.36	3	0.18	0.007	4.417	22.1	2.049	10.2
45	40	1	1	1	1	5674.94	8.955	0.268	5684.16	3	0.084	0.004	3.94	19.7	1.661	8.3
46	38	4	1	0	1	5286.65	9.505	0.64	5296.8	2	0.001	0	3.738	18.7	1.327	6.6
47	37	0	2	0	1	5379.13	9.48	0.459	5389.07	0	0.011	0.001	5.774	28.9	1.758	8.8
48	56	1	2	0	0	4719.65	10.675	1.34	4731.67	5	0.045	0.001	4.873	24.4	1.971	9.9
49	36	1	4	1	1	5846.99	10.51	0.702	5858.2	16	0.365	0.023	9.905	49.5	6.835	34.2
50	40	3	1	0	1	5602.83	14.71	1.3	5618.84	1	0.036	0.002	6.073	30.4	1.818	9.1
51	32	1	1	0	1	5503.24	12.195	0.899	5516.34	2	0.157	0.01	5.89	29.4	1.649	8.2
52	48	1	3	1	0	5629.2	11.235	0.929	5641.36	12	0.69	0.027	7.591	38	4.334	21.7
53	52	1	1	0	0	4068.33	8.015	1.407	4077.76	4	0.029	0.001	2.482	12.4	0.876	4.4
54	37	2	4	1	0	5448.28	8.87	0.593	5457.75	11	0.351	0.029	10.093	50.5	6.24	31.2
55	38	1	1	0	0	4048.13	6.95	1.34	4056.42	4	0.06	0.003	2.285	11.4	1.247	6.2
56	42	0	0	0	1	3876.89	6.83	0.895	3884.61	0	0.001	0	2.011	10.1	0	0
57	28	0	2	1	0	4715.05	13.1	0.711	4728.86	1	0.131	0.014	5.864	29.3	4.48	22.4
58	51	4	4	1	1	6863.06	10.83	0.824	6874.72	14	0.293	0.012	12.062	60.3	6.54	32.7
59	36	1	1	1	1	5749.27	11.185	0.314	5760.77	0	0.132	0.007	6.399	32	2.593	13
60	36	3	1	0	1	4544.28	7.855	1.419	4553.55	2	0.017	0.001	3.418	17.1	1.544	7.7
61	40	0	5	0	0	5403.55	10.915	0.885	5415.35	0	0.164	0.007	7.16	35.8	2.883	14.4
62	38	2	2	0	1	5023.94	12.56	1.142	5037.64	4	0.001	0	5.267	26.3	1.777	8.9
63	37	3	4	0	1	5911.04	12.665	1.199	5924.91	1	0.309	0.013	7.848	39.2	2.961	14.8
64	32	1	3	0	1	5707.27	11.475	0.708	5719.45	2	0.149	0.009	6.466	32.3	2.717	13.6
65	32	4	1	0	1	5802.54	8.84	0.634	5812.01	4	0.001	0	4.467	22.3	0.898	4.5
66	39	5	0	1	0	5353.37	9.085	0.664	5363.12	4	0	0	1.984	9.9	6.22	31.1

Table B-6
Alternative 6 Results

67	35	1	3	0	1	5813.06	12.585	1.148	5826.79	2	0.022	0.001	5.991	30	1.053	5.3
68	46	1	2	1	0	5532.2	10.015	1.478	5543.69	0	0.111	0.004	5.399	27	2.304	11.5
69	39	3	1	1	0	5452.64	13.36	1.024	5467.02	13	0.19	0.01	8.093	40.5	4.156	20.8
70	54	3	2	1	1	5219.38	13.1	1.295	5233.78	12	0.001	0	6.726	33.6	3.735	18.7
71	43	1	1	0	0	4086.43	7.935	1.019	4095.39	4	0.001	0	2.619	13.1	1.103	5.5
72	37	1	3	0	1	5527.13	11.9	0.949	5539.98	8	0.282	0.015	6.679	33.4	3.638	18.2
73	39	3	2	1	0	5051.02	11.62	0.488	5063.13	10	0.001	0	8.417	42.1	3.72	18.6
74	41	2	3	1	0	5130.13	13.515	1.571	5145.22	14	0.001	0	5.751	28.8	3.431	17.2
75	45	5	0	1	0	5388.35	8.665	0.662	5397.68	10	0	0	7.473	37.4	5.495	27.5
76	40	3	4	0	0	5809.9	8.505	1.387	5819.8	9	0.16	0.007	5.91	29.5	2.198	11
77	40	3	1	0	1	4556.85	11.355	1.932	4570.13	4	0.001	0	3.831	19.2	0.763	3.8
78	36	0	4	0	1	5340.83	14.07	1.141	5356.05	0	0.001	0	6.963	34.8	1.744	8.7
79	48	2	2	0	1	5642.74	15.61	1.405	5659.75	0	0.001	0	7.458	37.3	0.42	2.1
80	34	3	2	1	0	5769.69	11.075	0.845	5781.61	17	0.358	0.021	6.263	31.3	4.085	20.4
81	41	3	1	0	1	6034.25	12.565	0.93	6047.75	4	0.034	0.001	5.022	25.1	1.416	7.1
82	47	2	2	1	0	5204.99	14.545	1.105	5220.64	6	0.656	0.026	7.31	36.5	3.971	19.9
83	52	3	0	0	0	4532.34	11.12	1.698	4545.16	0	0.001	0	4.15	20.8	0.706	3.5
84	32	1	4	1	1	6100.39	10.22	0.751	6111.36	2	0.141	0.007	7.242	36.2	4.899	24.5
85	21	0	0	1	1	5643.49	9.165	0.205	5652.86	0	0	0	7.901	39.5	0.392	2
86	37	1	1	0	1	5329.56	11.55	1.03	5342.14	2	0.001	0	4.227	21.1	0.935	4.7
87	42	2	3	1	0	6297.23	11.585	0.867	6309.68	16	0.217	0.009	11.1	55.5	7.464	37.3
88	39	2	2	1	0	5286.81	13.935	0.774	5301.52	0	0.001	0	7.866	39.3	1.441	7.2
89	42	2	1	1	0	5134.75	10.115	1.73	5146.59	0	0.002	0	4.624	23.1	0.998	5
90	41	4	1	1	0	5014.35	13.05	1.183	5028.59	3	0.148	0.006	6.467	32.3	3.771	18.9
91	49	3	1	1	0	5076.81	15.23	1.114	5093.16	7	0.247	0.01	7.652	38.3	3.976	19.9
92	30	2	1	0	0	4965.2	9.01	1.168	4975.38	1	0.031	0.002	4.214	21.1	1.601	8
93	40	2	3	1	1	5412.22	12.78	1.188	5426.19	5	0.059	0.002	5.735	28.7	1.576	7.9
94	34	5	3	1	0	5707.87	8.47	0.576	5716.92	11	0.299	0.016	9.343	46.7	6.59	32.9
95	40	2	2	1	1	6552.88	11.675	0.694	6565.25	3	0.048	0.002	7.343	36.7	4.329	21.6
96	38	3	2	1	1	5392.65	9.3	0.542	5402.49	16	0.181	0.01	6.859	34.3	4.784	23.9
97	33	1	4	1	0	6453.88	10.02	1.018	6464.92	17	0.116	0.006	10.559	52.8	6.413	32.1
98	53	1	3	0	0	4698.03	10.475	0.972	4709.47	5	0.035	0.001	5.329	26.6	2.261	11.3
99	41	3	1	1	1	5807.12	11.625	0.884	5819.63	1	0.018	0.001	6.127	30.6	2.313	11.6
100	32	1	3	0	0	4735.75	8.62	1.72	4746.09	10	0.098	0.005	4.213	21.1	2.74	13.7

Table B-7
Alternative 7 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	26	0	0	0	0	3766.02	0.159	0	3766.48	0	0	0	1.445	7.2	0.156	0.8
Max	54	5	6	1	1	4749.13	1.339	0.867	4750.18	30	1.844	0.093	14.547	72.7	9.142	45.7
Range	28	5	6	1	1	983.103	1.18	0.867	983.705	30	1.844	0.093	13.102	65.5	8.986	44.9
Mean	39.8	1.76	2.14	0.55	0.53	3974.62	0.73733	0.35488	3975.72	14.1531	0.17196	0.00895	7.78966	38.9459	4.2468	21.2337
St Dev	6.38	1.37	1.36	0.5	0.5	236.981	0.30282	0.17326	237.179	7.28302	0.29245	0.01591	3.00463	15.0216	1.96872	9.84549
RUN																
1	43	2	1	1	0	3801.47	0.531	0.452	3802.46	5	0.42	0.018	7.59	38	4.404	22
2	38	0	3	1	0	4066.74	0.941	0.226	4067.91	18	0.001	0	8.275	41.4	4.403	22
3	42	1	1	0	1	3842.34	0.647	0.273	3843.26	5	0.042	0.002	6.122	30.6	2.222	11.1
4	32	2	3	0	1	3772.94	0.424	0.297	3773.66	8	0.032	0.002	4.021	20.1	2.366	11.8
5	43	0	0	1	0	3803.62	0.407	0.374	3804.4	10	0.001	0	3.587	17.9	1.886	9.4
6	44	1	3	0	0	3768.22	0.353	0.297	3768.87	12	0.001	0	2.552	12.8	2.049	10.2
7	52	2	5	0	0	3818.84	0.615	0.597	3820.06	28	0.226	0.009	7.522	37.6	4.945	24.7
8	44	0	1	1	1	3887.17	0.911	0.547	3888.62	14	0.001	0	7.507	37.5	2.574	12.9
9	54	2	2	1	0	3867.71	0.923	0.867	3869.5	19	0.19	0.008	10.009	50	4.86	24.3
10	51	0	2	1	1	3929.54	1.035	0.495	3931.07	18	0.001	0	8.692	43.5	3.96	19.8
11	46	1	2	1	0	3869.08	0.732	0.325	3870.14	19	0.199	0.009	8.156	40.8	6.171	30.9
12	38	0	1	1	1	4048.25	0.752	0.724	4049.72	10	0	0	6.741	33.7	2.77	13.9
13	45	0	5	0	0	3789.58	0.448	0.446	3790.47	21	0.001	0	4.483	22.4	4.033	20.2
14	36	2	1	1	0	4212.92	0.975	0.125	4214.02	14	0.001	0	10.607	53	4.107	20.5
15	49	1	2	1	0	4157.51	0.977	0.175	4158.67	16	0.122	0.006	10.22	51.1	5.809	29
16	37	2	5	0	0	3789.68	0.462	0.449	3790.59	22	0.016	0.001	6.202	31	4.931	24.7
17	35	2	6	0	0	3801.01	0.586	0.473	3802.07	25	0.001	0	6.708	33.5	5.285	26.4
18	35	0	2	0	0	3770.47	0.308	0.301	3771.08	6	0.067	0.004	2.6	13	1.529	7.6
19	28	5	2	1	0	4426.76	1.122	0.148	4428.03	24	0.855	0.058	14.547	72.7	7.2	36
20	33	0	3	1	1	3797.1	0.55	0.298	3797.94	4	0	0	4.64	23.2	2.841	14.2
21	50	2	1	0	0	3780.86	0.434	0.4	3781.69	5	0.052	0.002	4.871	24.4	2.362	11.8
22	36	0	3	1	1	4383.35	1.236	0.252	4384.84	11	0	0	11.666	58.3	5.347	26.7
23	42	2	0	1	1	3921.71	0.991	0.519	3923.22	12	0.001	0	4.216	21.1	2.586	12.9
24	39	3	2	1	1	3895.75	0.751	0.445	3896.95	7	0.067	0.003	5.204	26	4.707	23.5
25	38	4	2	1	1	3968.56	0.869	0.421	3969.85	24	0.339	0.021	10.823	54.1	7.351	36.8
26	36	0	2	0	1	4497.46	1.209	0.149	4498.82	8	0.001	0	11.52	57.6	1.335	6.7
27	38	1	2	0	0	3771.3	0.259	0.223	3771.78	6	0	0	3.054	15.3	0.993	5
28	48	3	1	0	1	3915.86	0.624	0.224	3916.7	16	0.076	0.003	7.837	39.2	3.097	15.5

Table B-7
Alternative 7 Results

29	45	2	1	0	0	3785.38	0.314	0.298	3785.99	8	0.599	0.025	5.664	28.3	4.097	20.5
30	44	4	2	0	1	3812.12	0.461	0.324	3812.91	19	1.076	0.049	9.063	45.3	7.942	39.7
31	46	1	1	1	1	4035.17	0.807	0.099	4036.07	11	0.003	0	8.462	42.3	5.858	29.3
32	38	3	3	0	1	4532.52	1.128	0.1	4533.75	5	0.062	0.003	12.85	64.2	3.732	18.7
33	30	1	0	1	1	3928.43	0.578	0	3929.01	2	0.02	0.001	6.144	30.7	2.016	10.1
34	36	1	3	1	0	4307.7	1.209	0.301	4309.21	26	0.149	0.009	11.805	59	5.721	28.6
35	42	0	0	0	0	3770.3	0.159	0.149	3770.6	0	0.001	0	1.445	7.2	0.156	0.8
36	41	0	1	0	0	3795.61	0.342	0.322	3796.28	2	0.001	0	2.98	14.9	0.745	3.7
37	39	1	1	1	1	4510.29	1.336	0.248	4511.87	6	0.001	0	12.52	62.6	1.685	8.4
38	40	2	2	1	0	3921.6	0.848	0.347	3922.79	15	0.028	0.002	7.917	39.6	5.062	25.3
39	49	4	2	1	1	3956.44	1.043	0.471	3957.95	21	0.465	0.027	11.043	55.2	9.142	45.7
40	40	1	3	1	0	3826.95	0.591	0.322	3827.87	10	0.001	0	5.805	29	3.821	19.1
41	32	3	1	0	1	3952.41	0.702	0.101	3953.21	9	0.001	0	7.139	35.7	2.906	14.5
42	43	2	0	0	1	4004.11	0.79	0.225	4005.12	4	0.035	0.002	7.837	39.2	2.431	12.2
43	35	0	4	0	1	4595.34	1.339	0.198	4596.88	16	0	0	13.88	69.4	3.094	15.5
44	29	0	2	0	0	3766.02	0.23	0.225	3766.48	8	0	0	1.936	9.7	1.712	8.6
45	30	2	1	0	1	3907.27	0.588	0.099	3907.95	12	0.687	0.05	8.9	44.5	5.743	28.7
46	34	2	2	1	0	3851.82	0.512	0.496	3852.82	21	0.474	0.03	6.966	34.8	6.073	30.4
47	28	4	4	0	1	3826.93	0.715	0.498	3828.14	20	0.133	0.008	8.45	42.2	4.537	22.7
48	48	3	2	1	1	3857.97	0.474	0.421	3858.87	22	0.291	0.013	6.414	32.1	5.162	25.8
49	34	2	3	0	1	4007.02	0.963	0.347	4008.33	14	0.318	0.017	9.314	46.6	4.329	21.6
50	44	2	3	1	0	4048.23	1.043	0.346	4049.62	25	0.157	0.008	10.057	50.3	6.361	31.8
51	35	0	1	1	1	4080.92	0.834	0.796	4082.55	14	0	0	7.073	35.4	4.622	23.1
52	40	1	2	0	1	3812.53	0.587	0.322	3813.44	9	0.037	0.002	5.09	25.5	1.738	8.7
53	35	1	1	1	1	4079.13	0.99	0.247	4080.37	14	0.001	0	8.41	42	2.782	13.9
54	37	0	4	0	0	3781.09	0.426	0.426	3781.94	14	0.001	0	3.715	18.6	2.524	12.6
55	51	2	1	0	1	4071.31	1.094	0.406	4072.81	8	0.273	0.009	12.599	63	4.733	23.7
56	32	2	2	0	0	3787.09	0.475	0.421	3787.98	8	0.001	0	5.082	25.4	2.069	10.3
57	31	4	1	0	0	3799.3	0.338	0.272	3799.91	8	1.221	0.075	5.687	28.4	3.546	17.7
58	34	5	2	1	1	3803.88	0.45	0.3	3804.63	19	0.024	0.001	7.033	35.2	4.253	21.3
59	42	1	0	0	1	4580.56	1.257	0.126	4581.94	1	0.001	0	12.743	63.7	1.033	5.2
60	46	3	4	1	1	4446.2	1.301	0.298	4447.8	30	0.091	0.005	14.046	70.2	6.316	31.6
61	38	0	2	1	0	4349.24	1.208	0.346	4350.79	19	0	0	12.121	60.6	5.158	25.8
62	38	1	2	1	0	3966.42	0.916	0.298	3967.63	18	0	0	7.567	37.8	3.589	17.9
63	38	3	4	1	1	4156.7	0.919	0.273	4157.89	26	0.21	0.011	11.25	56.3	7.276	36.4
64	46	1	2	0	0	3789.52	0.419	0.346	3790.29	6	0.028	0.001	3.427	17.1	2.526	12.6
65	35	0	1	1	1	4749.13	1.032	0.025	4750.18	1	0.007	0	12.34	61.7	0.691	3.5
66	37	2	1	0	0	3793.29	0.213	0.176	3793.68	10	0.495	0.027	5.572	27.9	3.61	18

Table B-7
Alternative 7 Results

67	46	3	0	0	0	3803.35	0.391	0.371	3804.12	9	0.17	0.007	5.253	26.3	2.407	12
68	44	2	4	1	0	3807.01	0.646	0.496	3808.15	17	0.575	0.025	8.545	42.7	6.85	34.3
69	50	2	3	1	1	3880.49	0.794	0.544	3881.83	27	0.102	0.005	6.506	32.5	7.437	37.2
70	44	2	1	1	0	3920.68	0.8	0.742	3922.22	16	0.007	0	7.868	39.3	5.164	25.8
71	43	2	3	0	0	3786.51	0.312	0.273	3787.09	18	0.151	0.008	5.042	25.2	3.881	19.4
72	36	4	2	0	1	3840.18	0.586	0.274	3841.04	13	0.072	0.005	8.025	40.1	5.219	26.1
73	37	2	4	1	1	4060.44	0.973	0.421	4061.83	25	0.002	0	9.134	45.7	6.882	34.4
74	42	2	3	1	0	4374.03	1.235	0.373	4375.64	15	0.054	0.002	6.544	32.7	4.999	25
75	38	3	1	1	1	3845.8	0.579	0.247	3846.63	9	0.269	0.013	7.42	37.1	4.21	21.1
76	37	2	4	0	1	3826.89	0.588	0.449	3827.93	14	0.278	0.013	7.133	35.7	3.588	17.9
77	45	1	2	0	0	3779.11	0.553	0.546	3780.2	14	0.034	0.002	5.866	29.3	2.83	14.2
78	39	3	3	0	0	3814.97	0.355	0.346	3815.67	19	1.844	0.093	9.214	46.1	8.512	42.6
79	37	0	2	1	1	4248.09	1.068	0.173	4249.33	20	0.001	0	10.218	51.1	4.68	23.4
80	28	1	3	1	0	3913.2	0.758	0.643	3914.6	22	0	0	6.209	31	5.767	28.8
81	45	5	1	1	0	3838.11	0.614	0.52	3839.25	26	0.525	0.023	6.702	33.5	7.699	38.5
82	33	1	2	1	0	3792.71	0.349	0.273	3793.34	8	0.017	0.001	3.795	19	2.596	13
83	36	3	0	0	1	3868.21	0.629	0.247	3869.09	7	0.342	0.019	8.25	41.3	4.483	22.4
84	29	2	1	1	1	4220.83	0.987	0.12	4221.93	15	0.154	0.012	9.734	48.7	5.419	27.1
85	48	4	4	1	0	3905.98	0.659	0.649	3907.29	25	0.277	0.011	9.467	47.3	6.403	32
86	48	2	3	0	1	3818.92	0.77	0.646	3820.34	15	0.001	0	7.945	39.7	4.362	21.8
87	45	0	1	1	1	3850.51	0.763	0.4	3851.68	6	0.063	0.003	6.438	32.2	3.264	16.3
88	42	2	2	0	1	4092.41	0.958	0.272	4093.64	10	0.129	0.006	9.227	46.1	3.384	16.9
89	51	1	4	1	1	3942.66	1.016	0.619	3944.29	21	0.103	0.005	9.243	46.2	6.231	31.2
90	36	1	5	1	1	3904.98	1.084	0.768	3906.84	29	0.546	0.029	10.638	53.2	8.244	41.2
91	37	0	1	1	0	3920.58	0.746	0.223	3921.55	12	0	0	6.25	31.2	2.938	14.7
92	33	1	1	1	0	4298.74	1.083	0.148	4299.97	14	0	0	9.853	49.3	4.822	24.1
93	26	2	4	0	1	3862.86	0.626	0.273	3863.76	16	0.193	0.014	8.556	42.8	4.426	22.1
94	49	4	0	1	1	4558.05	1.195	0.602	4559.85	14	0.177	0.008	13.172	65.9	4.372	21.9
95	37	5	3	1	0	3847.65	0.566	0.446	3848.66	19	0.698	0.034	8.671	43.4	6.925	34.6
96	40	3	4	0	1	3993.23	1	0.399	3994.63	17	0.258	0.01	12.471	62.4	6.367	31.8
97	42	1	2	1	0	3801.21	0.512	0.297	3802.02	11	0.178	0.008	5.725	28.6	3.858	19.3
98	33	0	2	1	0	3782.54	0.373	0.327	3783.24	6	0.001	0	3.263	16.3	2.203	11
99	43	2	4	1	1	3973.07	0.97	0.396	3974.44	27	0.087	0.004	10.52	52.6	6.912	34.6
100	46	2	1	0	1	3805.76	0.489	0.396	3806.64	6	0.36	0.014	6.037	30.2	2.745	13.7

Table B-8
Alternative 8 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	26	0	0	0	0	3750.26	0.19	0	3750.64	0	0	0	1.445	7.2	0.156	0.8
Max	54	5	6	1	1	4724.72	1.355	0.728	4725.83	30	1.935	0.097	14.613	73.1	9.142	45.7
Range	28	5	6	1	1	974.457	1.165	0.728	975.19	30	1.935	0.097	13.168	65.9	8.986	44.9
Mean	39.8	1.76	2.14	0.55	0.53	3987.86	0.74099	0.33828	3988.94	13.9388	0.16037	0.0085	7.72886	38.6429	4.19901	20.9959
St Dev	6.38	1.37	1.36	0.5	0.5	238.296	0.29534	0.14297	238.49	7.13264	0.28265	0.01534	3.00662	15.0307	1.90732	9.53722
RUN																
1	43	2	1	1	0	3805.7	0.537	0.464	3806.7	5	0.429	0.018	7.503	37.5	4.404	22
2	38	0	3	1	0	4072.77	0.964	0.234	4073.97	18	0.001	0	8.275	41.4	4.403	22
3	42	1	1	0	1	3836.14	0.664	0.31	3837.12	6	0.042	0.002	6.162	30.8	1.879	9.4
4	32	2	3	0	1	3777.86	0.438	0.315	3778.61	8	0.032	0.002	4.021	20.1	2.366	11.8
5	43	0	0	1	0	3819.61	0.437	0.404	3820.46	10	0.001	0	3.587	17.9	1.886	9.4
6	44	1	3	0	0	3766.77	0.369	0.313	3767.45	12	0.001	0	2.515	12.6	2.049	10.2
7	52	2	5	0	0	3832.4	0.534	0.53	3833.47	29	0.063	0.002	6.999	35	4.485	22.4
8	44	0	1	1	1	3898.16	0.898	0.545	3899.6	14	0.001	0	7.276	36.4	2.574	12.9
9	54	2	2	1	0	3926.56	0.839	0.728	3928.13	21	0.124	0.006	9.268	46.3	4.636	23.2
10	51	0	2	1	1	3956.79	0.96	0.401	3958.15	18	0.001	0	8.687	43.4	4.32	21.6
11	46	1	2	1	0	3862.86	0.719	0.3	3863.88	19	0.319	0.014	8.049	40.2	6.175	30.9
12	38	0	1	1	1	4152.76	0.72	0.316	4153.8	10	0	0	6.276	31.4	2.77	13.9
13	45	0	5	0	0	3802.89	0.456	0.454	3803.8	21	0.001	0	4.483	22.4	4.033	20.2
14	36	2	1	1	0	4241.43	0.971	0.094	4242.49	14	0.001	0	10.607	53	4.107	20.5
15	49	1	2	1	0	4158.3	0.993	0.175	4159.47	16	0.122	0.006	10.22	51.1	5.809	29
16	37	2	5	0	0	3808.67	0.479	0.474	3809.62	22	0.011	0.001	6.198	31	4.638	23.2
17	35	2	6	0	0	3803.69	0.599	0.476	3804.77	25	0.001	0	6.708	33.5	5.285	26.4
18	35	0	2	0	0	3773.26	0.322	0.321	3773.91	6	0.067	0.004	2.6	13	1.529	7.6
19	28	5	2	1	0	4401.43	1.134	0.17	4402.74	24	0.977	0.066	14.613	73.1	7.2	36
20	33	0	3	1	1	3795.77	0.568	0.316	3796.66	4	0	0	4.637	23.2	2.841	14.2
21	50	2	1	0	0	3784.58	0.472	0.438	3785.49	5	0.052	0.002	4.911	24.6	2.362	11.8
22	36	0	3	1	1	4373.44	1.257	0.271	4374.97	11	0	0	11.586	57.9	5.307	26.5
23	42	2	0	1	1	3941.65	1.015	0.554	3943.22	12	0.001	0	4.305	21.5	2.647	13.2
24	39	3	2	1	1	3922.62	0.747	0.401	3923.76	7	0.104	0.005	5.198	26	5.052	25.3
25	38	4	2	1	1	4190.05	0.925	0.218	4191.19	15	0.061	0.003	10.852	54.3	6.13	30.6
26	36	0	2	0	1	4502.1	1.21	0.15	4503.46	8	0.001	0	11.52	57.6	1.335	6.7
27	38	1	2	0	0	3762.8	0.284	0.248	3763.33	6	0	0	3.054	15.3	0.993	5
28	48	3	1	0	1	3965.7	0.655	0.255	3966.61	14	0.293	0.013	9.581	47.9	3.42	17.1

Table B-8
Alternative 8 Results

29	45	2	1	0	0	3790.57	0.335	0.331	3791.23	8	0.505	0.021	5.57	27.9	4.014	20.1
30	44	4	2	0	1	3801.64	0.481	0.35	3802.47	20	0.927	0.043	9.186	45.9	7.252	36.3
31	46	1	1	1	1	4023.41	0.832	0.133	4024.37	11	0.045	0.002	8.422	42.1	5.96	29.8
32	38	3	3	0	1	4508.03	1.143	0.126	4509.3	5	0.062	0.003	12.89	64.4	3.807	19
33	30	1	0	1	1	3928.43	0.578	0	3929.01	2	0.02	0.001	6.144	30.7	2.016	10.1
34	36	1	3	1	0	4323.68	1.19	0.286	4325.16	26	0.107	0.007	11.805	59	5.759	28.8
35	42	0	0	0	0	3750.26	0.19	0.19	3750.64	0	0.001	0	1.445	7.2	0.156	0.8
36	41	0	1	0	0	3768.56	0.412	0.407	3769.38	2	0.001	0	3.189	15.9	0.745	3.7
37	39	1	1	1	1	4503.52	1.349	0.268	4505.14	6	0.001	0	12.52	62.6	1.685	8.4
38	40	2	2	1	0	3915.95	0.862	0.328	3917.14	15	0.216	0.012	7.873	39.4	5.285	26.4
39	49	4	2	1	1	3963.56	1.047	0.465	3965.07	21	0.465	0.027	11.062	55.3	9.142	45.7
40	40	1	3	1	0	3819.49	0.607	0.333	3820.43	10	0.001	0	5.805	29	3.821	19.1
41	32	3	1	0	1	3951.73	0.704	0.098	3952.54	9	0.001	0	7.139	35.7	2.906	14.5
42	43	2	0	0	1	3995.9	0.785	0.225	3996.91	4	0.038	0.002	7.737	38.7	2.474	12.4
43	35	0	4	0	1	4598.42	1.355	0.214	4599.98	16	0	0	13.92	69.6	3.094	15.5
44	29	0	2	0	0	3769.1	0.236	0.231	3769.56	8	0	0	1.936	9.7	1.712	8.6
45	30	2	1	0	1	3878.08	0.586	0.114	3878.78	12	0.814	0.06	8.908	44.5	5.751	28.8
46	34	2	2	1	0	3894.29	0.511	0.507	3895.3	21	0.474	0.03	6.886	34.4	6.073	30.4
47	28	4	4	0	1	3841.44	0.725	0.512	3842.68	20	0.139	0.009	8.456	42.3	4.543	22.7
48	48	3	2	1	1	3863.85	0.513	0.479	3864.84	22	0.058	0.003	4.805	24	5.287	26.4
49	34	2	3	0	1	4026.58	0.904	0.292	4027.78	15	0.33	0.018	9.594	48	4.649	23.2
50	44	2	3	1	0	4043.32	1.057	0.356	4044.73	25	0.184	0.01	10.097	50.5	6.368	31.8
51	35	0	1	1	1	4144.44	0.78	0.328	4145.55	14	0.003	0	6.532	32.7	4.718	23.6
52	40	1	2	0	1	3816.32	0.614	0.349	3817.28	9	0.037	0.002	5.09	25.5	1.738	8.7
53	35	1	1	1	1	4088.2	0.986	0.233	4089.42	14	0.001	0	8.41	42	2.82	14.1
54	37	0	4	0	0	3783.51	0.447	0.447	3784.4	14	0.001	0	3.627	18.1	2.524	12.6
55	51	2	1	0	1	4113.25	1.093	0.384	4114.73	8	0.014	0.001	12.46	62.3	4.074	20.4
56	32	2	2	0	0	3783.74	0.483	0.428	3784.65	8	0.001	0	5.082	25.4	2.069	10.3
57	31	4	1	0	0	3795.39	0.348	0.293	3796.03	8	0.388	0.024	6.072	30.4	3.075	15.4
58	34	5	2	1	1	3792.6	0.45	0.311	3793.36	19	0.076	0.005	7.053	35.3	4.372	21.9
59	42	1	0	0	1	4558.81	1.274	0.153	4560.24	1	0.001	0	12.743	63.7	1.06	5.3
60	46	3	4	1	1	4457.68	1.313	0.298	4459.29	30	0.094	0.005	14.006	70	6.276	31.4
61	38	0	2	1	0	4348.82	1.197	0.335	4350.35	19	0	0	12.117	60.6	5.256	26.3
62	38	1	2	1	0	3973.47	0.92	0.286	3974.67	18	0	0	7.567	37.8	3.598	18
63	38	3	4	1	1	4186.27	0.883	0.252	4187.4	26	0.194	0.011	11.267	56.3	7.269	36.3
64	46	1	2	0	0	3777.72	0.434	0.362	3778.52	6	0.028	0.001	3.507	17.5	2.526	12.6
65	35	0	1	1	1	4724.72	1.056	0.057	4725.83	1	0.01	0.001	12.34	61.7	0.691	3.5
66	37	2	1	0	0	3770.78	0.246	0.206	3771.23	10	0.578	0.032	5.794	29	3.692	18.5

Table B-8
Alternative 8 Results

67	46	3	0	0	0	3813.32	0.402	0.398	3814.12	9	0.22	0.01	5.173	25.9	2.438	12.2
68	44	2	4	1	0	3829.88	0.649	0.5	3831.03	17	0.411	0.018	8.25	41.3	6.646	33.2
69	50	2	3	1	1	3925.38	0.839	0.506	3926.72	27	0.146	0.007	6.6	33	6.298	31.5
70	44	2	1	1	0	4036.55	0.728	0.611	4037.89	16	0	0	7.019	35.1	5.157	25.8
71	43	2	3	0	0	3775.51	0.336	0.307	3776.16	18	0.174	0.009	5.105	25.5	3.92	19.6
72	36	4	2	0	1	3831.4	0.605	0.299	3832.31	11	0.077	0.005	7.825	39.1	5.021	25.1
73	37	2	4	1	1	4190.75	0.644	0.085	4191.48	23	0.144	0.008	9.134	45.7	7.488	37.4
74	42	2	3	1	0	4391.88	1.252	0.382	4393.52	15	0.065	0.003	6.472	32.4	4.854	24.3
75	38	3	1	1	1	3837.94	0.613	0.287	3838.84	9	0.269	0.013	7.512	37.6	4.21	21.1
76	37	2	4	0	1	3836.8	0.621	0.497	3837.92	15	0.058	0.003	7.196	36	3.303	16.5
77	45	1	2	0	0	3794.56	0.558	0.557	3795.67	14	0.034	0.002	5.76	28.8	2.83	14.2
78	39	3	3	0	0	3808.01	0.377	0.375	3808.76	19	1.935	0.097	9.289	46.4	8.613	43.1
79	37	0	2	1	1	4248.93	1.097	0.189	4250.21	18	0.001	0	10.138	50.7	4.637	23.2
80	28	1	3	1	0	4008.83	0.773	0.426	4010.03	18	0	0	5.325	26.6	5.792	29
81	45	5	1	1	0	3874.01	0.649	0.624	3875.28	26	0.397	0.016	8.94	44.7	6.711	33.6
82	33	1	2	1	0	3784.14	0.365	0.289	3784.8	8	0.017	0.001	3.795	19	2.596	13
83	36	3	0	0	1	3848.3	0.635	0.259	3849.2	7	0.426	0.024	8.351	41.8	4.608	23
84	29	2	1	1	1	4220.9	1	0.118	4222.02	15	0.181	0.015	9.734	48.7	5.419	27.1
85	48	4	4	1	0	3977.29	0.625	0.59	3978.51	25	0.21	0.008	9.087	45.4	6.325	31.6
86	48	2	3	0	1	3843.83	0.794	0.63	3845.26	15	0.001	0	7.996	40	4.248	21.2
87	45	0	1	1	1	3844.4	0.794	0.431	3845.63	6	0.07	0.003	6.39	32	3.348	16.7
88	42	2	2	0	1	4072.94	0.978	0.304	4074.22	10	0.147	0.007	9.347	46.7	3.442	17.2
89	51	1	4	1	1	4036.76	1.003	0.38	4038.14	17	0.001	0	6.217	31.1	5.76	28.8
90	36	1	5	1	1	4014.39	1.06	0.637	4016.09	28	0.513	0.026	10.368	51.8	8.042	40.2
91	37	0	1	1	0	3900.91	0.756	0.223	3901.89	12	0	0	6.13	30.6	2.938	14.7
92	33	1	1	1	0	4291.67	1.095	0.157	4292.92	14	0	0	9.853	49.3	4.822	24.1
93	26	2	4	0	1	3849.59	0.648	0.31	3850.54	16	0.193	0.014	8.556	42.8	4.486	22.4
94	49	4	0	1	1	4581.98	1.173	0.369	4583.53	14	0.185	0.008	12.483	62.4	4.379	21.9
95	37	5	3	1	0	3842.86	0.581	0.43	3843.87	19	0.954	0.046	9.021	45.1	7.073	35.4
96	40	3	4	0	1	4001.92	1.018	0.42	4003.36	15	0.145	0.006	12.358	61.8	6.254	31.3
97	42	1	2	1	0	3793.45	0.539	0.33	3794.32	11	0.184	0.009	5.686	28.4	3.858	19.3
98	33	0	2	1	0	3773.62	0.4	0.354	3774.38	6	0.001	0	3.263	16.3	2.203	11
99	43	2	4	1	1	3990.82	0.928	0.335	3992.08	27	0.087	0.004	10.126	50.6	6.912	34.6
100	46	2	1	0	1	3802.72	0.491	0.398	3803.61	6	0.379	0.015	5.96	29.8	2.787	13.9

Table B-9
Alternative 9 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	25	0	0	0	0	5297.49	0.025	0	5297.68	0	0.001	0	0	0	0	0
Max	56	5	8	1	1	6148.72	5.85	0.738	6152.83	22	0.862	0.041	8.146	40.7	8.12	40.6
Range	31	5	8	1	1	851.23	5.825	0.738	855.151	22	0.861	0.041	8.146	40.7	8.12	40.6
Mean	39.3	2.1	1.99	0.44	0.48	5544.26	2.21189	0.29394	5546.77	5.53061	0.07095	0.00322	3.23669	16.1827	3.09391	15.4663
St Dev	6.9	1.29	1.5	0.5	0.5	208.417	1.20541	0.18191	209.043	4.77618	0.12185	0.00583	1.78827	8.94395	1.86514	9.33006
RUN																
1	43	2	1	1	0	5311.38	0.695	0	5312.07	0	0.002	0	0.581	2.9	0.581	2.9
2	33	0	3	1	0	5764.65	2.85	0.48	5767.98	11	0.076	0.005	5.948	29.7	5.948	29.7
3	28	3	2	1	0	5659.57	2.955	0.232	5662.76	3	0.058	0.004	4.304	21.5	5.163	25.8
4	36	2	2	1	0	6134.76	2.11	0.301	6137.17	10	0.001	0	6.254	31.3	6.254	31.3
5	44	2	5	0	1	5620.48	4.09	0.666	5625.23	11	0.132	0.005	5.3	26.5	4.1	20.5
6	53	2	0	0	0	5307.68	0.395	0.074	5308.15	1	0.037	0.001	0.43	2.1	0.43	2.1
7	53	0	3	0	0	5457.6	2.25	0.445	5460.3	6	0.128	0.004	3.591	18	3.591	18
8	36	3	2	0	1	5391.18	2.27	0.352	5393.8	1	0.068	0.003	2.771	13.9	2.301	11.5
9	33	3	2	1	1	5619.58	3.3	0.348	5623.23	11	0.165	0.009	5.256	26.3	4.195	21
10	37	1	4	0	0	5395.06	2.32	0.46	5397.84	4	0.031	0.001	2.875	14.4	2.875	14.4
11	36	1	1	1	0	5503.8	3.56	0.175	5507.54	2	0.068	0.004	3.882	19.4	3.882	19.4
12	33	1	3	1	0	5542.1	2.9	0.576	5545.58	14	0.004	0	4.304	21.5	4.304	21.5
13	43	1	2	1	1	5878.88	2.17	0.412	5881.46	13	0.063	0.003	4.614	23.1	3.617	18.1
14	48	2	3	1	1	5941.18	4.635	0.292	5946.1	4	0.266	0.012	6.048	30.2	6.195	31
15	41	1	1	0	0	5319.74	0.66	0.127	5320.53	0	0.002	0	0.686	3.4	0.686	3.4
16	41	5	0	1	0	5516.77	0.625	0.123	5517.52	10	0.001	0	3.62	18.1	3.62	18.1
17	45	2	1	0	1	5365.47	1.78	0.351	5367.6	1	0.095	0.003	2.264	11.3	2.264	11.3
18	31	4	3	1	1	5651.77	4.665	0.465	5656.9	7	0.53	0.027	3.969	19.8	6.757	33.8
19	40	0	0	0	0	5300.45	0.025	0	5300.47	0	0.002	0	0	0	0	0
20	40	5	2	0	0	5319.66	1.21	0.239	5321.11	3	0.044	0.002	1.654	8.3	1.654	8.3
21	35	0	2	0	1	5668.89	1.91	0.259	5671.06	3	0.225	0.012	2.499	12.5	1.847	9.2
22	39	2	5	1	1	5810.93	5.85	0.709	5817.49	13	0.271	0.011	8.146	40.7	8.12	40.6
23	50	1	0	0	0	5301.47	0.025	0	5301.49	0	0.002	0	0	0	0	0
24	32	2	2	0	0	5337.79	1.45	0.263	5339.5	1	0.014	0.001	1.699	8.5	1.699	8.5
25	39	1	1	0	0	5320.06	0.73	0.141	5320.93	12	0.006	0	1.248	6.2	1.248	6.2
26	29	3	1	1	1	6077.83	2.74	0.315	6080.88	10	0.001	0	6.273	31.4	6.266	31.3
27	34	4	2	1	0	5418.01	3.99	0.561	5422.57	3	0.004	0	4.743	23.7	4.743	23.7
28	37	2	2	1	0	5322.43	1.315	0.109	5323.85	0	0.022	0.001	1.425	7.1	1.425	7.1

Table B-9
Alternative 9 Results

29	36	2	0	1	0	5436.2	1.555	0.159	5437.92	10	0.001	0	2.086	10.4	2.086	10.4
30	43	2	0	0	0	5301.61	0.025	0	5301.63	0	0.002	0	0	0	0	0
31	41	3	0	0	1	5492.76	0.82	0.103	5493.68	0	0.002	0	0.915	4.6	0	0
32	40	4	6	0	1	5492.9	3.185	0.418	5496.5	22	0.043	0.002	5.137	25.7	5.137	25.7
33	36	2	3	0	1	5678.04	3.715	0.566	5682.32	6	0.095	0.004	5.184	25.9	4.443	22.2
34	27	3	4	0	0	5423.06	2.595	0.515	5426.17	10	0.096	0.005	4.06	20.3	4.06	20.3
35	41	4	2	1	1	5474.81	2.695	0.125	5477.63	1	0.006	0	3.722	18.6	3.722	18.6
36	38	3	2	1	1	5583.33	2.195	0.35	5585.88	10	0.054	0.002	4.247	21.2	4.047	20.2
37	40	4	2	0	1	5417.05	2.76	0.422	5420.23	5	0.036	0.002	3.502	17.5	2.984	14.9
38	39	2	4	0	0	5348.49	1.375	0.27	5350.13	10	0.029	0.001	2.165	10.8	2.165	10.8
39	29	2	1	0	0	5330.91	1.03	0.202	5332.14	1	0.002	0	0.922	4.6	0.922	4.6
40	50	1	2	1	0	5721.64	1.73	0.137	5723.5	10	0.001	0	2.825	14.1	2.825	14.1
41	39	1	4	1	0	5606.69	4.525	0.447	5611.66	6	0.074	0.003	5.992	30	5.992	30
42	52	2	1	0	0	5330.35	1.145	0.224	5331.72	0	0.005	0	1.294	6.5	1.294	6.5
43	43	1	2	1	1	5695.73	2.04	0.342	5698.11	10	0.001	0	3.818	19.1	3.507	17.5
44	31	3	1	1	0	5777.62	1.375	0.116	5779.11	10	0.001	0	3.563	17.8	3.563	17.8
45	46	1	0	1	0	5532.12	0.935	0.109	5533.16	10	0.001	0	2.5	12.5	2.5	12.5
46	40	1	2	1	1	5851.87	2.195	0.132	5854.2	10	0.171	0.009	3.291	16.5	2.926	14.6
47	47	2	5	0	1	5540.34	3.61	0.616	5544.57	10	0.059	0.002	4.743	23.7	4.547	22.7
48	34	2	2	0	1	5375.81	0.98	0.177	5376.96	8	0.262	0.014	1.557	7.8	1.377	6.9
49	33	2	5	0	0	5480.63	3.705	0.738	5485.07	11	0.028	0.001	4.709	23.5	4.709	23.5
50	31	3	0	0	0	5307.46	0.465	0.089	5308.01	0	0.001	0	0.462	2.3	0.462	2.3
51	45	2	1	0	1	5394.83	1.395	0.241	5396.47	6	0.208	0.008	2.364	11.8	2.047	10.2
52	39	2	1	0	0	5362.3	1.47	0.289	5364.06	0	0.026	0.001	1.913	9.6	1.913	9.6
53	36	2	1	0	0	5311.97	0.665	0.128	5312.76	4	0.042	0.002	0.936	4.7	0.936	4.7
54	45	2	3	0	1	5560.52	3.755	0.609	5564.89	6	0.048	0.002	4.911	24.6	4.071	20.4
55	48	2	1	1	0	5417.05	2.58	0.096	5419.72	1	0.143	0.007	2.846	14.2	2.846	14.2
56	36	1	0	0	1	5406.04	0.52	0	5406.56	0	0.001	0	0.436	2.2	0	0
57	30	5	2	1	0	5560.81	2.17	0.43	5563.41	10	0.002	0	3.845	19.2	3.845	19.2
58	42	3	1	1	0	5615.42	0.83	0.157	5616.4	0	0.862	0.041	4.552	22.8	4.552	22.8
59	38	0	2	0	1	5390.3	2.385	0.245	5392.93	1	0.002	0	1.937	9.7	2.046	10.2
60	37	2	8	0	0	5562.84	4.315	0.706	5567.86	13	0.03	0.001	6.064	30.3	6.064	30.3
61	29	4	1	1	0	5612.35	3.345	0.195	5615.89	0	0.001	0	3.266	16.3	3.266	16.3
62	40	0	1	1	0	5683.58	2.51	0.234	5686.32	1	0.005	0	3.786	18.9	5.359	26.8
63	40	2	3	1	1	5521.52	2.295	0.454	5524.27	10	0.006	0	3.292	16.5	2.752	13.8
64	32	1	3	0	1	5654.27	2.595	0.308	5657.17	3	0.026	0.002	3.745	18.7	2.674	13.4
65	32	4	1	0	1	5366.63	1.005	0.181	5367.81	3	0.064	0.003	1.287	6.4	1.047	5.2
66	39	5	0	1	0	5976.19	2.11	0.336	5978.63	10	0.137	0.009	6.107	30.5	6.107	30.5

Table B-9
Alternative 9 Results

67	39	1	0	1	0	5412.79	2.18	0	5414.97	0	0.001	0	1.993	10	1.993	10
68	41	0	3	0	1	5627.88	3.285	0.604	5631.77	5	0.185	0.007	4.955	24.8	4.594	23
69	34	3	2	0	0	5416.13	2.185	0.437	5418.75	1	0.095	0.004	3.608	18	3.608	18
70	56	1	3	0	1	5585.19	3.865	0.451	5589.5	11	0.273	0.009	5.451	27.3	4.477	22.4
71	31	0	1	0	0	5297.49	0.16	0.028	5297.68	1	0.026	0.002	0.219	1.1	0.219	1.1
72	36	3	1	0	1	5636.89	2.04	0.303	5639.23	2	0.003	0	2.193	11	1.177	5.9
73	25	2	2	0	1	5902.85	2.23	0.228	5905.3	3	0.026	0.002	2.696	13.5	2.295	11.5
74	33	1	2	1	0	5931.34	3.895	0.372	5935.61	3	0.236	0.014	5.774	28.9	6.671	33.4
75	32	2	4	0	1	5473.39	1.945	0.334	5475.67	5	0.006	0	2.512	12.6	2.512	12.6
76	55	2	2	0	0	5353.42	1.32	0.26	5355	4	0.06	0.002	1.943	9.7	1.943	9.7
77	35	5	2	0	0	5328.97	1.385	0.274	5330.63	5	0.002	0	1.708	8.5	1.708	8.5
78	39	2	2	1	1	5784.9	3.16	0.436	5788.49	15	0.052	0.002	5.592	28	4.932	24.7
79	46	2	2	1	0	5380.93	2.195	0.143	5383.27	6	0.004	0	2.63	13.1	2.63	13.1
80	45	1	2	1	0	6015.1	1.835	0.22	6017.15	11	0.049	0.003	5.537	27.7	5.537	27.7
81	34	2	1	0	1	5420.03	1.215	0.218	5421.47	4	0.079	0.004	1.59	8	1.196	6
82	49	3	0	0	1	5844.35	1.685	0.143	5846.18	3	0.055	0.002	1.785	8.9	0.918	4.6
83	47	2	4	0	1	5472.76	3.52	0.468	5476.75	3	0.021	0.001	3.158	15.8	4.78	23.9
84	30	2	3	1	0	5354.91	2.38	0.273	5357.56	1	0.013	0.001	2.407	12	2.407	12
85	53	4	2	1	0	5333.66	1.73	0.218	5335.61	7	0.005	0	2.447	12.2	2.447	12.2
86	31	2	2	1	1	5644.54	4.005	0.328	5648.87	2	0.01	0	4.321	21.6	3.881	19.4
87	50	3	1	0	1	5436.5	2.21	0.355	5439.06	2	0.012	0	2.375	11.9	1.622	8.1
88	27	3	4	0	1	6148.72	3.615	0.494	6152.83	9	0.237	0.011	5.657	28.3	4.161	20.8
89	40	1	2	1	1	5655.31	2.84	0.149	5658.3	2	0.011	0	2.922	14.6	2.262	11.3
90	46	1	1	1	0	5506.84	1.52	0.272	5508.64	10	0.014	0.001	3.373	16.9	3.373	16.9
91	45	1	0	0	1	5303.16	0.385	0.052	5303.6	0	0.002	0	0.336	1.7	0.22	1.1
92	34	0	3	1	0	5577.59	2.39	0.358	5580.34	13	0.054	0.004	4.874	24.4	4.874	24.4
93	42	3	2	0	1	5849.28	2.81	0.336	5852.43	5	0.153	0.006	3.321	16.6	2.106	10.5
94	51	1	2	0	1	5740.01	2.255	0.289	5742.56	3	0.312	0.012	3.601	18	3.601	18
95	39	2	2	1	0	5546.75	2.68	0.116	5549.55	4	0.018	0.001	3.409	17	3.644	18.2
96	43	1	3	0	1	5500.31	3.16	0.581	5504.05	6	0.083	0.003	5.207	26	5.068	25.3
97	40	3	0	0	1	5388.66	1.435	0	5390.1	0	0.002	0	1.36	6.8	0	0
98	40	2	1	0	1	5386.96	1.56	0.293	5388.81	0	0.002	0	1.45	7.2	1.362	6.8
99	44	5	4	1	1	5575.77	3.79	0.666	5580.22	14	0.037	0.001	4.842	24.2	4.842	24.2
100	46	0	2	1	0	5724.92	1.37	0.246	5726.54	11	0.002	0	6.114	30.6	6.114	30.6

Table B-10
Alternative 10 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	25	0	0	0	0	5292.57	0.92	0.066	5293.67	0	0	0	0	0	0	0
Max	57	6	5	1	1	6234.46	10.015	1.509	6240.86	22	0.616	0.029	7.269	36.3	7.756	38.8
Range	32	6	5	1	1	941.895	9.095	1.443	947.193	22	0.616	0.029	7.269	36.3	7.756	38.8
Mean	39.2	2.2	2	0.44	0.34	5573.86	4.7673	0.68119	5579.31	5.4898	0.07662	0.00348	3.18534	15.9245	3.15615	15.7786
St Dev	5.77	1.49	1.27	0.5	0.48	230.295	1.92041	0.30423	231.34	5.50964	0.11682	0.0056	1.80005	9.00704	1.92255	9.61729
RUN																
1	43	2	1	1	0	5307.63	2.675	0.269	5310.57	0	0.001	0	0.581	2.9	0.581	2.9
2	33	0	3	1	0	5810.8	5.985	0.961	5817.75	11	0.067	0.004	5.588	27.9	5.588	27.9
3	28	3	2	1	0	5703.9	5.95	0.453	5710.3	2	0.116	0.007	4.209	21	5.067	25.3
4	36	2	2	1	0	6148.41	4.475	0.457	6153.34	10	0.001	0	5.962	29.8	5.962	29.8
5	48	2	1	0	1	5499.75	4.395	0.455	5504.6	4	0.047	0.002	1.796	9	0.728	3.6
6	44	3	3	0	0	5468.1	5.385	1.058	5474.55	11	0.049	0.002	3.933	19.7	3.933	19.7
7	37	2	3	1	0	5500.46	7.85	1.233	5509.54	5	0.174	0.007	5.04	25.2	5.04	25.2
8	48	4	3	0	0	5425.85	5.595	1.016	5432.46	0	0.06	0.002	3.319	16.6	3.319	16.6
9	29	0	2	1	0	5351.06	3.4	0.347	5354.81	1	0.071	0.004	1.984	9.9	1.984	9.9
10	37	3	0	1	0	5866.08	3.375	0.565	5870.02	10	0.001	0	4.04	20.2	4.04	20.2
11	42	4	4	0	1	5592.97	5.975	0.825	5599.77	6	0.205	0.008	3.768	18.8	3.623	18.1
12	43	0	1	0	0	5362.51	3.08	0.614	5366.2	1	0.14	0.006	1.387	6.9	1.387	6.9
13	41	2	1	1	1	5643.6	4.2	0.692	5648.49	10	0.001	0	4.163	20.8	4.123	20.6
14	40	5	1	1	0	5716.36	3.785	0.74	5720.88	12	0.027	0.001	4.737	23.7	4.737	23.7
15	38	5	2	1	0	5933.58	4.835	0.883	5939.3	14	0.153	0.01	6.789	33.9	6.789	33.9
16	45	2	3	1	0	6005.48	8.805	0.815	6015.1	11	0.04	0.002	6.653	33.3	7.756	38.8
17	39	3	1	1	0	5704.82	4.505	0.853	5710.17	10	0.028	0.001	5.179	25.9	5.179	25.9
18	42	0	1	1	1	5648.3	7.195	0.243	5655.74	0	0	0	3.166	15.8	2.87	14.4
19	38	3	2	0	0	5469.69	4.645	0.791	5475.12	9	0.203	0.009	3.264	16.3	3.264	16.3
20	39	1	1	0	0	5315.65	2.505	0.499	5318.66	0	0.001	0	0.647	3.2	0.647	3.2
21	38	4	1	0	1	5560.37	5.715	0.666	5566.75	0	0.016	0.001	2.932	14.7	2.051	10.3
22	57	6	4	1	0	6203.7	8.595	1.236	6213.54	20	0.308	0.012	7.269	36.3	7.237	36.2
23	37	0	0	0	1	5335.01	1.66	0.222	5336.89	0	0.001	0	0.32	1.6	0	0
24	45	2	1	0	0	5425.99	4.01	0.798	5430.8	0	0.034	0.001	2.183	10.9	2.183	10.9
25	36	0	3	0	0	5339.58	2.96	0.591	5343.13	1	0.339	0.015	2.118	10.6	2.118	10.6
26	49	3	1	0	0	5329.04	2.91	0.564	5332.51	2	0.07	0.002	1.205	6	1.205	6
27	31	0	0	1	0	5855.54	3.845	0.593	5859.98	10	0	0	3.25	16.3	3.25	16.3
28	43	2	1	1	0	5367.89	4.76	0.435	5373.08	0	0.064	0.002	2.013	10.1	2.013	10.1

Table B-10
Alternative 10 Results

29	27	5	2	1	0	5363.11	4.585	0.463	5368.16	4	0.013	0.001	2.13	10.7	2.13	10.7
30	45	0	0	0	0	5293.88	1.095	0.218	5295.19	0	0.001	0	0	0	0	0
31	41	1	3	0	1	5688.47	6.545	0.738	5695.75	3	0.394	0.017	4.774	23.9	4.401	22
32	38	6	2	0	0	5425.58	5.175	0.979	5431.73	2	0.086	0.003	2.799	14	2.799	14
33	35	3	5	0	1	5706.07	8.25	1.509	5715.83	8	0.036	0.001	5.398	27	5.398	27
34	46	4	0	0	0	5315.83	2.51	0.485	5318.83	0	0.007	0	0.738	3.7	0.738	3.7
35	34	2	1	0	0	5344.97	2.635	0.526	5348.13	0	0.001	0	0.984	4.9	0.984	4.9
36	36	2	3	0	1	5603.37	4.05	0.612	5608.03	13	0.105	0.006	3.537	17.7	3.511	17.6
37	40	2	4	1	0	5948.13	7.05	1.011	5956.2	8	0.04	0.002	5.397	27	7.483	37.4
38	44	1	3	0	0	5457.05	5.205	1.039	5463.3	5	0.257	0.011	3.507	17.5	3.507	17.5
39	25	1	4	0	1	5514.37	5.785	0.939	5521.09	5	0.009	0	3.732	18.7	3.674	18.4
40	44	3	3	1	1	5674.26	6.75	0.644	5681.66	2	0.056	0.002	3.545	17.7	2.985	14.9
41	44	5	1	0	1	5390.56	4.075	0.705	5395.34	6	0.158	0.005	2.128	10.6	1.763	8.8
42	41	4	1	0	1	5580.95	5.1	0.726	5586.78	0	0.002	0	1.567	7.8	0.945	4.7
43	33	4	3	1	0	5405.43	7.225	1.311	5413.97	4	0.02	0.001	3.583	17.9	3.583	17.9
44	37	0	2	1	0	5847.07	5.205	0.285	5852.56	4	0.001	0	0.868	4.3	5.866	29.3
45	31	2	1	1	0	5999.34	3.765	0.405	6003.51	10	0	0	4.912	24.6	4.912	24.6
46	35	3	4	1	1	5671.29	4.205	0.496	5675.99	16	0.115	0.008	5.313	26.6	4.753	23.8
47	41	0	1	0	0	5394.98	2.66	0.321	5397.96	0	0.001	0	1.25	6.2	1.25	6.2
48	46	2	5	1	0	5823.96	5.275	0.892	5830.13	20	0.001	0	4.76	23.8	4.76	23.8
49	47	3	1	0	1	5364.47	2.725	0.511	5367.71	2	0.017	0.001	1.042	5.2	0.662	3.3
50	38	3	2	0	0	5395.53	4	0.797	5400.33	3	0.072	0.003	2.455	12.3	2.455	12.3
51	42	2	2	1	0	5943.09	3.71	0.215	5947.01	10	0	0	5.417	27.1	5.417	27.1
52	38	1	1	0	0	5393.26	2.91	0.582	5396.75	1	0.026	0.001	1.488	7.4	1.488	7.4
53	41	3	1	0	1	5441.07	4.33	0.8	5446.2	0	0.002	0	1.849	9.2	1.552	7.8
54	43	3	3	1	0	5537	7.61	0.679	5545.29	6	0.175	0.007	5.572	27.9	5.572	27.9
55	37	3	0	0	1	5304.53	1.555	0.304	5306.39	0	0.001	0	0.129	0.6	0	0
56	44	2	2	0	0	5359.95	3.56	0.521	5364.03	0	0.001	0	1.248	6.2	1.248	6.2
57	37	0	1	0	1	6013.05	4.12	0.369	6017.54	0	0.001	0	2.944	14.7	2.508	12.5
58	38	1	2	0	1	5608.51	3.325	0.356	5612.19	6	0.001	0	1.485	7.4	0.765	3.8
59	39	1	2	1	1	5924.08	6.855	1.04	5931.98	11	0.08	0.005	5.945	29.7	5.669	28.3
60	47	2	2	0	0	5342.06	4.245	0.847	5347.16	5	0.037	0.001	1.969	9.8	1.969	9.8
61	33	0	4	1	1	5891.15	5.09	0.809	5897.05	14	0.001	0	3.939	19.7	3.219	16.1
62	42	3	4	1	0	5966.11	8.17	1.143	5975.42	15	0.4	0.02	6.378	31.9	6.378	31.9
63	43	1	1	0	0	5295.92	1.885	0.279	5298.08	0	0.001	0	0.244	1.2	0.244	1.2
64	43	1	2	1	1	5812.92	7.28	1.049	5821.25	11	0.001	0	5.257	26.3	4.977	24.9
65	42	2	1	1	0	5848.42	1.745	0.287	5850.45	10	0	0	4.8	24	4.8	24
66	35	0	3	1	0	5629.01	6.83	0.817	5636.66	4	0.012	0.001	4.148	20.7	5.527	27.6

Table B-10
Alternative 10 Results

67	36	2	2	1	0	5656.08	7.465	0.839	5664.39	18	0.126	0.006	4.481	22.4	4.481	22.4
68	35	1	2	0	0	5374.6	4.105	0.62	5379.32	0	0.143	0.006	2.549	12.7	2.549	12.7
69	39	5	1	0	1	5879.98	6.035	0.826	5886.84	3	0.03	0.001	3.198	16	2.037	10.2
70	43	2	5	1	0	5646.91	6.165	1.2	5654.27	14	0.009	0	6.373	31.9	6.373	31.9
71	29	0	1	0	1	5357.1	2.48	0.293	5359.88	5	0.106	0.007	1.899	9.5	1.899	9.5
72	37	3	5	0	0	5489.97	4.465	0.89	5495.32	9	0.616	0.028	3.327	16.6	3.327	16.6
73	39	4	4	0	0	5643.46	6.89	1.375	5651.72	11	0.079	0.003	4.271	21.4	4.271	21.4
74	31	2	2	0	0	5481.08	4.505	0.9	5486.49	7	0.023	0.001	2.872	14.4	2.872	14.4
75	50	2	3	1	0	5678.35	10.015	1.104	5689.47	7	0.001	0	5.358	26.8	5.358	26.8
76	34	2	1	1	1	5493.53	4.235	0.371	5498.14	3	0.035	0.002	2.315	11.6	2.306	11.5
77	37	2	1	0	0	5319.19	2.305	0.408	5321.91	1	0.001	0	1.139	5.7	1.139	5.7
78	43	2	2	0	1	5418.4	3.92	0.438	5422.76	2	0.127	0.005	2.352	11.8	1.672	8.4
79	50	3	2	0	0	5452.45	3.04	0.605	5456.09	5	0.275	0.009	1.849	9.2	1.849	9.2
80	34	4	1	0	1	5500.01	5.015	0.849	5505.87	0	0.04	0.002	2.596	13	2.436	12.2
81	49	2	1	0	1	5707.51	4.125	0.472	5712.1	4	0.033	0.001	2.135	10.7	1.51	7.5
82	37	2	0	0	0	5292.57	0.92	0.181	5293.67	0	0.001	0	0	0	0	0
83	37	1	1	0	0	5327.49	2.145	0.428	5330.07	0	0.003	0	1.053	5.3	1.053	5.3
84	37	2	1	0	0	5336.13	1.98	0.393	5338.5	4	0.001	0	0.64	3.2	0.64	3.2
85	26	1	2	1	0	5343.88	4.135	0.642	5348.66	1	0.052	0.003	2.256	11.3	2.256	11.3
86	43	2	2	1	0	5703.81	6.71	0.86	5711.38	10	0.001	0	2.754	13.8	2.754	13.8
87	45	4	2	0	0	5425.11	4.215	0.811	5430.13	2	0.092	0.003	2.387	11.9	2.387	11.9
88	37	4	2	0	0	5553.85	5.12	1.007	5559.98	10	0.411	0.018	4.34	21.7	4.34	21.7
89	34	1	3	0	0	5372.53	3.82	0.761	5377.11	2	0.001	0	1.948	9.7	1.948	9.7
90	36	4	3	0	0	5398.4	5.185	0.816	5404.4	2	0.106	0.004	2.555	12.8	2.555	12.8
91	48	2	2	1	1	5609.35	6.49	0.846	5616.69	12	0.001	0	5.309	26.5	4.589	22.9
92	32	1	3	1	0	5599.07	4.54	0.712	5604.32	22	0.124	0.009	5.094	25.5	5.094	25.5
93	37	3	4	0	1	5711.75	8.29	1.372	5721.42	2	0.187	0.007	5.54	27.7	5.53	27.6
94	42	0	1	1	1	5539.91	5.475	0.101	5545.49	0	0.015	0.001	3.053	15.3	2.813	14.1
95	30	0	0	1	1	5655.85	5.655	0.066	5661.57	0	0	0	2.48	12.4	1.64	8.2
96	38	3	2	1	0	5549.81	8.84	0.749	5559.4	2	0.086	0.004	4.528	22.6	4.528	22.6
97	46	1	2	0	0	5398.55	3.175	0.632	5402.36	0	0.02	0.001	1.569	7.8	1.569	7.8
98	34	3	3	1	0	6234.46	5.855	0.544	6240.86	14	0.459	0.029	6.874	34.4	6.874	34.4
99	41	3	1	1	1	5441.82	5.315	0.692	5447.82	1	0.005	0	2.774	13.9	2.519	12.6
100	32	1	3	0	0	5353.29	3.065	0.601	5356.96	8	0.02	0.001	1.738	8.7	1.738	8.7

Table B-11
Alternative 11 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	28	0	0	0	0	4651.4	0	0	4651.78	0	0	0	0	0	0	0
Max	55	6	6	1	1	5759.32	0.53	0.519	5759.62	45	1.205	0.067	11.423	57.1	9.452	47.3
Range	27	6	6	1	1	1107.92	0.53	0.519	1107.84	45	1.205	0.067	11.423	57.1	9.452	47.3
Mean	39.7	1.8	2.01	0.55	0.53	5202.54	0.2004	0.0589	5202.8	13.5102	0.19771	0.01081	5.63959	28.1949	4.41965	22.0929
St Dev	6.58	1.43	1.29	0.5	0.5	202.722	0.14734	0.10345	202.812	8.73473	0.2632	0.01482	2.73209	13.6606	2.35216	11.7613
RUN																
1	43	2	1	1	0	5287.07	0.054	0	5287.12	0	0.001	0	0.581	2.9	0.581	2.9
2	38	0	3	1	0	5188.3	0.276	0.094	5188.67	16	1.054	0.059	7.665	38.3	7.665	38.3
3	42	1	1	0	1	5214.78	0.04	0.048	5214.86	1	0.192	0.008	3.909	19.5	1.546	7.7
4	32	2	3	0	1	5253.79	0.061	0	5253.85	6	0.293	0.018	3.494	17.5	2.799	14
5	43	0	0	1	0	5319.75	0.173	0.17	5320.09	10	0.001	0	1.886	9.4	1.886	9.4
6	44	1	3	0	0	4926.98	0	0	4926.98	19	0.001	0	5.525	27.6	5.525	27.6
7	52	2	5	0	0	4698.4	0.258	0.019	4698.67	45	0.039	0.002	7.681	38.4	7.681	38.4
8	44	0	1	1	1	5133.56	0.269	0	5133.83	21	0.002	0	7.601	38	4.684	23.4
9	54	2	2	1	0	5113.97	0.248	0.245	5114.47	13	0.932	0.042	5.93	29.6	5.93	29.6
10	51	0	2	1	1	5384.08	0.36	0.077	5384.52	15	0.048	0.002	4.856	24.3	3.749	18.7
11	46	1	2	1	0	5142.57	0.16	0	5142.73	15	0.409	0.018	6.584	32.9	6.091	30.5
12	38	0	1	1	1	5461.62	0.415	0.396	5462.43	10	0	0	4.63	23.1	2.312	11.6
13	45	0	5	0	0	5068.14	0.156	0.038	5068.34	21	0.876	0.047	6.532	32.7	7.405	37
14	36	2	1	1	0	5493.91	0.279	0.019	5494.21	10	0.001	0	3.264	16.3	2.784	13.9
15	49	1	2	1	0	5402.64	0.302	0.133	5403.08	10	0.132	0.006	5.955	29.8	5.919	29.6
16	37	2	5	0	0	4950.12	0.151	0	4950.27	24	0.179	0.01	6.665	33.3	6.665	33.3
17	35	2	6	0	0	4833.97	0.276	0.019	4834.26	21	0.945	0.054	8.919	44.6	8.919	44.6
18	35	0	2	0	0	5167.1	0.368	0	5167.47	13	0	0	2.994	15	2.994	15
19	28	5	2	1	0	5064.17	0.086	0.023	5064.28	24	0	0	10.371	51.9	7.343	36.7
20	33	0	3	1	1	5060.23	0.178	0	5060.4	15	0.446	0.042	6.718	33.6	5.785	28.9
21	50	2	1	0	0	5125.41	0.15	0	5125.56	7	0.001	0	2.627	13.1	2.627	13.1
22	36	0	3	1	1	5271.64	0.461	0	5272.1	18	0.179	0.013	11.374	56.9	8.48	42.4
23	42	2	0	1	1	5335.31	0.266	0.227	5335.81	10	0.001	0	2.849	14.2	1.867	9.3
24	39	3	2	1	1	5159.01	0.051	0	5159.06	14	0.001	0	5.736	28.7	4.801	24
25	38	4	2	1	1	5372.29	0.305	0.227	5372.83	12	0.05	0.002	5.928	29.6	5.205	26
26	36	0	2	0	1	5095.77	0.091	0	5095.86	3	0.834	0.042	7.934	39.7	3.844	19.2
27	38	1	2	0	0	4947.01	0.258	0.019	4947.29	14	0	0	4.751	23.8	4.751	23.8
28	48	3	1	0	1	5323.33	0.187	0.063	5323.58	2	0.113	0.004	2.7	13.5	1.288	6.4

Table B-11
Alternative 11 Results

29	45	2	1	0	0	5219.72	0.052	0.048	5219.82	5	0.155	0.006	1.765	8.8	1.765	8.8
30	44	4	2	0	1	5194.25	0.04	0.019	5194.31	7	0.388	0.014	2.285	11.4	2.061	10.3
31	46	1	1	1	1	5196.51	0.494	0.019	5197.02	9	0.001	0	8.157	40.8	6.126	30.6
32	38	3	3	0	1	5344.74	0.411	0	5345.15	15	0.039	0.002	11.007	55	4.274	21.4
33	30	1	0	1	1	5316.82	0.061	0.019	5316.9	0	0.001	0	2.093	10.5	0.116	0.6
34	36	1	3	1	0	5161.46	0.178	0.019	5161.66	26	0.41	0.027	11.423	57.1	8.756	43.8
35	42	0	0	0	0	5288.42	0.003	0	5288.42	0	0.001	0	0	0	0	0
36	41	0	1	0	0	5158.17	0.004	0	5158.17	5	0.001	0	1.48	7.4	1.48	7.4
37	39	1	1	1	1	5381.49	0.142	0	5381.63	8	0.259	0.012	5.427	27.1	2.285	11.4
38	40	2	2	1	0	5314.59	0.37	0.019	5314.98	11	0.226	0.012	5.402	27	4.728	23.6
39	49	4	2	1	1	4945.61	0.027	0.019	4945.65	18	0.357	0.019	3.62	18.1	9.452	47.3
40	40	1	3	1	0	5026.09	0.174	0.019	5026.28	15	0.36	0.022	6.497	32.5	6.497	32.5
41	32	3	1	0	1	5312.76	0.264	0	5313.03	8	0.114	0.006	5.853	29.3	1.917	9.6
42	43	2	0	0	1	5466.35	0.429	0	5466.78	0	0.001	0	5.872	29.4	0	0
43	35	0	4	0	1	5087.41	0.261	0	5087.67	23	0	0	10.645	53.2	4.665	23.3
44	29	0	2	0	0	5134.53	0.063	0.06	5134.65	4	0.583	0.035	3.505	17.5	3.505	17.5
45	30	2	1	0	1	5041.51	0.121	0.057	5041.69	10	0.001	0	4.126	20.6	2.845	14.2
46	34	2	2	1	0	5182.43	0.286	0.269	5182.99	16	0.03	0.002	5.717	28.6	5.717	28.6
47	28	4	4	0	1	4827.94	0.188	0.019	4828.14	24	0.122	0.009	8.166	40.8	6.524	32.6
48	48	3	2	1	1	5146.91	0.01	0.019	5146.94	28	0.026	0.001	5.623	28.1	5.658	28.3
49	34	2	3	0	1	5172.74	0.164	0.038	5172.94	17	0.001	0	8.339	41.7	3.978	19.9
50	44	2	3	1	0	5001.96	0.139	0.049	5002.15	26	0.152	0.009	10.619	53.1	8.045	40.2
51	35	0	1	1	1	5438.31	0.53	0.519	5439.36	15	0.549	0.044	8.014	40.1	5.452	27.3
52	40	1	2	0	1	5248.56	0.128	0.019	5248.71	2	0.269	0.012	3.264	16.3	2.011	10.1
53	35	1	1	1	1	5230.78	0.133	0.019	5230.93	16	0.001	0	4.004	20	3.967	19.8
54	37	0	4	0	0	4957.62	0.411	0	4958.03	24	0.005	0	3.936	19.7	5.259	26.3
55	51	2	1	0	1	5273.36	0.115	0.019	5273.49	1	0.153	0.005	2.176	10.9	1.089	5.4
56	32	2	2	0	0	5157.58	0.003	0	5157.58	8	0.001	0	2.236	11.2	2.236	11.2
57	31	4	1	0	0	5204.38	0.08	0	5204.46	5	0.243	0.013	1.984	9.9	1.984	9.9
58	34	5	2	1	1	4961.56	0.104	0	4961.66	16	0.728	0.045	5.147	25.7	4.084	20.4
59	42	1	0	0	1	5693.01	0.426	0	5693.43	0	0.001	0	5.129	25.6	0.287	1.4
60	46	3	4	1	1	5139.68	0.157	0.132	5139.97	27	0.091	0.005	6.486	32.4	6.305	31.5
61	38	0	2	1	0	5473.72	0.378	0.019	5474.12	26	0.222	0.016	10.394	52	6.77	33.8
62	38	1	2	1	0	5270.14	0.412	0.019	5270.57	18	0.564	0.035	7.417	37.1	5.466	27.3
63	38	3	4	1	1	5114.32	0.028	0	5114.35	26	0.052	0.003	9.127	45.6	7.458	37.3
64	46	1	2	0	0	5118.19	0.002	0	5118.19	13	0.001	0	2.513	12.6	2.513	12.6
65	35	0	1	1	1	5759.32	0.252	0.049	5759.62	2	0.117	0.007	4.791	24	1.359	6.8
66	37	2	1	0	0	5281	0.003	0	5281	4	0.001	0	0.428	2.1	0.428	2.1

Table B-11
Alternative 11 Results

67	46	3	0	0	0	5275.68	0.004	0	5275.68	8	0.27	0.012	1.119	5.6	1.119	5.6
68	44	2	4	1	0	4908.82	0.115	0	4908.94	21	0.001	0	7.832	39.2	7.832	39.2
69	50	2	3	1	1	5248.14	0.325	0.132	5248.6	24	0.225	0.01	7.775	38.9	5.251	26.3
70	44	2	1	1	0	5259.62	0.372	0.378	5260.37	13	0.565	0.038	6.256	31.3	6.256	31.3
71	43	2	3	0	0	5072.07	0.332	0	5072.4	16	0.005	0	2.896	14.5	4.941	24.7
72	36	4	2	0	1	5220.54	0.191	0	5220.74	1	0.332	0.015	5.372	26.9	3.07	15.4
73	37	2	4	1	1	5368.12	0.166	0.303	5368.59	23	0.111	0.006	8.66	43.3	7.908	39.5
74	42	2	3	1	0	5646.41	0.514	0.065	5646.99	14	0.459	0.019	7.605	38	4.44	22.2
75	38	3	1	1	1	5278.21	0.065	0	5278.28	5	0.007	0	0.341	1.7	2.875	14.4
76	37	2	4	0	1	4827.23	0.021	0.019	4827.27	23	0.001	0	5.97	29.9	5.97	29.9
77	45	1	2	0	0	5087.66	0.053	0.049	5087.76	11	0.232	0.011	4.688	23.4	4.688	23.4
78	39	3	3	0	0	4651.4	0.388	0	4651.78	33	0.395	0.028	8.979	44.9	8.979	44.9
79	37	0	2	1	1	5070.7	0.075	0.019	5070.79	25	0.376	0.023	7.783	38.9	6.725	33.6
80	28	1	3	1	0	4931.67	0.112	0.03	4931.81	27	0	0	9.226	46.1	9.226	46.1
81	45	5	1	1	0	5114.73	0.02	0	5114.75	17	0.746	0.028	4.6	23	4.6	23
82	33	1	2	1	0	5049.41	0.059	0	5049.47	3	1.205	0.067	4.644	23.2	4.644	23.2
83	36	3	0	0	1	5317.43	0.311	0.023	5317.77	0	0.336	0.016	4.929	24.6	1.78	8.9
84	31	2	1	1	1	5432.2	0.304	0.208	5432.72	12	0.084	0.007	6.885	34.4	5.805	29
85	44	2	1	1	1	5292.99	0.225	0.212	5293.43	14	0.051	0.002	3.925	19.6	3.925	19.6
86	44	0	3	1	0	4986.98	0.288	0	4987.27	23	0	0	6.968	34.8	6.968	34.8
87	43	6	0	1	0	5287.33	0.077	0	5287.4	0	0.026	0.001	1.681	8.4	1.681	8.4
88	38	2	3	0	1	5168.79	0.296	0	5169.08	14	0.001	0	7.663	38.3	3.676	18.4
89	39	1	2	1	1	5334.08	0.394	0	5334.48	7	0.001	0	6.949	34.7	4.118	20.6
90	55	3	2	1	0	5322.97	0.196	0.17	5323.33	13	0.001	0	3.779	18.9	3.779	18.9
91	53	0	2	0	1	5110.34	0.049	0	5110.39	22	0.429	0.019	7.648	38.2	5.157	25.8
92	31	0	1	0	1	5584.1	0.434	0	5584.54	3	0.164	0.011	6.211	31.1	1.49	7.5
93	28	0	2	1	1	5381.4	0.01	0.359	5381.77	16	0	0	7.795	39	7.206	36
94	31	3	4	0	1	5090.21	0.043	0.029	5090.29	16	0.456	0.027	10.505	52.5	5.555	27.8
95	37	3	1	0	0	5182.43	0.003	0	5182.43	7	0.552	0.025	3.514	17.6	3.514	17.6
96	52	3	1	1	1	5333.72	0.2	0.076	5333.99	4	0.001	0	3.372	16.9	2.067	10.3
97	33	3	2	1	0	5415.39	0.293	0.019	5415.7	10	0	0	3.257	16.3	3.03	15.1
98	41	1	2	1	0	5140.05	0.206	0.202	5140.46	21	0.001	0	4.921	24.6	4.844	24.2
99	35	5	2	1	1	5178.89	0.401	0.048	5179.34	17	0.441	0.023	10.009	50	6.5	32.5
100	47	2	0	1	1	5716.06	0.505	0.221	5716.79	10	0.001	0	6.843	34.2	3.565	17.8

Table B-12
Alternative 12 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	28	0	0	0	0	4651.4	0	0	4651.78	0	0	0	0	0	0	0
Max	55	6	6	1	1	5762.38	0.53	0.41	5762.68	45	1.507	0.081	11.423	57.1	9.201	46
Range	27	6	6	1	1	1110.98	0.53	0.41	1110.9	45	1.507	0.081	11.423	57.1	9.201	46
Mean	39.7	1.8	2.01	0.55	0.53	5204.19	0.20519	0.05134	5204.44	13.5	0.20304	0.01112	5.64568	28.2265	4.41919	22.0918
St Dev	6.58	1.43	1.29	0.5	0.5	209.839	0.14445	0.08338	209.925	8.76109	0.2887	0.01607	2.73044	13.6535	2.33933	11.6978
RUN																
1	43	2	1	1	0	5287.07	0.054	0	5287.12	0	0.001	0	0.581	2.9	0.581	2.9
2	38	0	3	1	0	5190.81	0.276	0.102	5191.19	16	1.054	0.059	7.665	38.3	7.665	38.3
3	42	1	1	0	1	5234.7	0.072	0.038	5234.81	1	0.1	0.004	3.756	18.8	1.328	6.6
4	32	2	3	0	1	5247.27	0.079	0.018	5247.36	6	0.457	0.027	3.607	18	2.912	14.6
5	43	0	0	1	0	5330.31	0.187	0.184	5330.68	10	0.001	0	1.886	9.4	1.886	9.4
6	44	1	3	0	0	4926.98	0	0	4926.98	19	0.001	0	5.525	27.6	5.525	27.6
7	52	2	5	0	0	4703.65	0.238	0.033	4703.92	45	0.039	0.002	7.641	38.2	7.641	38.2
8	44	0	1	1	1	5133.56	0.269	0	5133.83	21	0.002	0	7.601	38	4.684	23.4
9	54	2	2	1	0	5145.52	0.248	0.246	5146.01	13	0.932	0.042	5.93	29.6	5.93	29.6
10	51	0	2	1	1	5075.6	0.231	0.055	5075.88	20	0.032	0.001	8.127	40.6	5.575	27.9
11	46	1	2	1	0	5142.57	0.16	0	5142.73	15	0.409	0.018	6.584	32.9	6.091	30.5
12	38	0	1	1	1	5523.49	0.415	0.223	5524.12	10	0	0	4.63	23.1	2.312	11.6
13	45	0	5	0	0	4934.28	0.217	0.034	4934.53	21	1.507	0.081	7.155	35.8	8.028	40.1
14	36	2	1	1	0	5494.18	0.272	0.011	5494.47	10	0.001	0	3.104	15.5	2.784	13.9
15	49	1	2	1	0	5413.5	0.309	0.141	5413.95	10	0.111	0.005	5.948	29.7	5.859	29.3
16	37	2	5	0	0	4950.12	0.151	0	4950.27	24	0.179	0.01	6.665	33.3	6.665	33.3
17	35	2	6	0	0	4834.92	0.262	0.033	4835.22	21	0.938	0.054	8.934	44.7	8.934	44.7
18	35	0	2	0	0	5167.1	0.368	0	5167.47	13	0	0	2.994	15	2.994	15
19	28	5	2	1	0	5064.52	0.091	0.031	5064.64	24	0	0	10.57	52.9	7.343	36.7
20	33	0	3	1	1	5046.1	0.188	0.008	5046.29	15	0.489	0.046	6.801	34	5.869	29.3
21	50	2	1	0	0	5125.41	0.15	0	5125.56	7	0.001	0	2.627	13.1	2.627	13.1
22	36	0	3	1	1	5271.64	0.461	0	5272.1	18	0.179	0.013	11.374	56.9	8.48	42.4
23	42	2	0	1	1	5348.99	0.266	0.227	5349.48	10	0.001	0	2.849	14.2	1.867	9.3
24	39	3	2	1	1	5159.01	0.051	0	5159.06	14	0.001	0	5.736	28.7	4.801	24
25	38	4	2	1	1	5422.06	0.27	0.192	5422.52	12	0.05	0.002	5.529	27.6	4.828	24.1
26	36	0	2	0	1	5095.77	0.091	0	5095.86	3	0.834	0.042	7.934	39.7	3.844	19.2
27	38	1	2	0	0	4945.91	0.242	0.03	4946.18	14	0	0	4.791	24	4.791	24
28	48	3	1	0	1	5324.35	0.192	0.069	5324.61	2	0.113	0.004	2.7	13.5	1.288	6.4

Table B-12
Alternative 12 Results

29	45	2	1	0	0	5233.56	0.05	0.047	5233.66	4	0.114	0.004	1.668	8.3	1.668	8.3
30	44	4	2	0	1	5193.65	0.057	0.036	5193.74	7	0.388	0.014	2.285	11.4	2.061	10.3
31	46	1	1	1	1	5205.39	0.497	0.022	5205.91	5	0.806	0.037	8.197	41	6.166	30.8
32	38	3	3	0	1	5344.66	0.411	0.008	5345.08	15	0.039	0.002	11.007	55	4.274	21.4
33	30	1	0	1	1	5316.45	0.071	0.029	5316.55	0	0.001	0	2.095	10.5	0.116	0.6
34	36	1	3	1	0	5160.72	0.186	0.026	5160.93	26	0.41	0.027	11.423	57.1	8.756	43.8
35	42	0	0	0	0	5288.42	0.003	0	5288.42	0	0.001	0	0	0	0	0
36	41	0	1	0	0	5158.17	0.004	0	5158.17	5	0.001	0	1.48	7.4	1.48	7.4
37	39	1	1	1	1	5381.49	0.142	0	5381.63	8	0.259	0.012	5.427	27.1	2.285	11.4
38	40	2	2	1	0	5304.86	0.381	0.015	5305.25	11	0.27	0.014	5.486	27.4	4.812	24.1
39	49	4	2	1	1	4967.46	0.047	0.018	4967.52	18	0.255	0.014	3.333	16.7	9.164	45.8
40	40	1	3	1	0	5022.5	0.184	0.032	5022.72	15	0.358	0.022	6.505	32.5	6.505	32.5
41	32	3	1	0	1	5312.76	0.264	0	5313.03	8	0.114	0.006	5.853	29.3	1.917	9.6
42	43	2	0	0	1	5466.35	0.429	0	5466.78	0	0.001	0	5.872	29.4	0	0
43	35	0	4	0	1	5087.41	0.261	0	5087.67	23	0	0	10.645	53.2	4.665	23.3
44	29	0	2	0	0	5034.12	0.063	0.059	5034.24	5	0.432	0.027	4.273	21.4	4.273	21.4
45	30	2	1	0	1	5044.47	0.128	0.072	5044.67	10	0.001	0	4.167	20.8	2.886	14.4
46	34	2	2	1	0	5204.01	0.299	0.296	5204.61	16	0.03	0.002	5.717	28.6	5.717	28.6
47	28	4	4	0	1	4826.09	0.193	0.019	4826.3	24	0.132	0.01	8.193	41	6.552	32.8
48	48	3	2	1	1	5144.24	0.016	0.015	5144.27	28	0.037	0.002	5.703	28.5	5.738	28.7
49	34	2	3	0	1	5173.48	0.164	0.038	5173.68	17	0.001	0	8.339	41.7	3.978	19.9
50	44	2	3	1	0	5001.03	0.158	0.08	5001.27	26	0.125	0.007	10.592	53	8.018	40.1
51	35	0	1	1	1	5508.35	0.53	0.184	5509.06	15	0.549	0.044	8.014	40.1	5.452	27.3
52	40	1	2	0	1	5250.49	0.127	0.017	5250.64	2	0.263	0.012	3.2	16	1.946	9.7
53	35	1	1	1	1	5229.57	0.136	0.023	5229.73	16	0.001	0	4.004	20	3.967	19.8
54	37	0	4	0	0	4957.62	0.411	0	4958.03	24	0.005	0	3.936	19.7	5.259	26.3
55	51	2	1	0	1	5273.25	0.115	0.019	5273.38	1	0.153	0.005	2.176	10.9	1.089	5.4
56	32	2	2	0	0	5157.58	0.003	0	5157.58	8	0.001	0	2.236	11.2	2.236	11.2
57	31	4	1	0	0	5204.38	0.08	0	5204.46	5	0.243	0.013	1.984	9.9	1.984	9.9
58	34	5	2	1	1	4961.56	0.104	0	4961.66	16	0.728	0.045	5.147	25.7	4.084	20.4
59	42	1	0	0	1	5693.01	0.426	0	5693.43	0	0.001	0	5.129	25.6	0.287	1.4
60	46	3	4	1	1	5147.85	0.169	0.144	5148.17	27	0.091	0.005	6.552	32.8	6.305	31.5
61	38	0	2	1	0	5477.83	0.365	0.012	5478.21	26	0.236	0.017	10.185	50.9	6.783	33.9
62	38	1	2	1	0	5270	0.401	0.008	5270.41	18	0.604	0.038	7.217	36.1	5.426	27.1
63	38	3	4	1	1	5114.18	0.02	0.008	5114.2	26	0.052	0.003	9.127	45.6	7.458	37.3
64	46	1	2	0	0	5118.19	0.002	0	5118.19	13	0.001	0	2.513	12.6	2.513	12.6
65	35	0	1	1	1	5762.38	0.271	0.034	5762.68	2	0.074	0.004	4.791	24	1.353	6.8
66	37	2	1	0	0	5281	0.003	0	5281	4	0.001	0	0.428	2.1	0.428	2.1

Table B-12
Alternative 12 Results

67	46	3	0	0	0	5275.68	0.004	0	5275.68	8	0.27	0.012	1.119	5.6	1.119	5.6
68	44	2	4	1	0	4908.82	0.115	0	4908.94	21	0.001	0	7.832	39.2	7.832	39.2
69	50	2	3	1	1	5257.02	0.334	0.145	5257.5	24	0.203	0.009	7.792	39	5.268	26.3
70	44	2	1	1	0	5395.29	0.403	0.41	5396.11	13	0.379	0.025	6.059	30.3	6.059	30.3
71	43	2	3	0	0	5072.07	0.332	0	5072.4	16	0.005	0	2.896	14.5	4.941	24.7
72	36	4	2	0	1	5220.54	0.191	0	5220.74	1	0.332	0.015	5.372	26.9	3.07	15.4
73	37	2	4	1	1	5419.17	0.161	0.302	5419.64	22	0.036	0.002	7.638	38.2	7.206	36
74	42	2	3	1	0	5651.42	0.499	0.02	5651.94	14	0.459	0.019	7.445	37.2	4.44	22.2
75	38	3	1	1	1	5278.21	0.065	0	5278.28	5	0.007	0	0.341	1.7	2.875	14.4
76	37	2	4	0	1	4827.49	0.01	0.008	4827.51	23	0.001	0	6.01	30.1	6.01	30.1
77	45	1	2	0	0	5082.15	0.053	0.05	5082.25	12	0.127	0.006	4.626	23.1	4.626	23.1
78	39	3	3	0	0	4651.4	0.388	0	4651.78	33	0.395	0.028	8.979	44.9	8.979	44.9
79	37	0	2	1	1	5065.12	0.075	0.03	5065.22	25	0.376	0.023	7.783	38.9	6.725	33.6
80	28	1	3	1	0	4936.03	0.108	0.029	4936.17	27	0	0	9.201	46	9.201	46
81	45	5	1	1	0	5114.73	0.02	0	5114.75	17	0.746	0.028	4.6	23	4.6	23
82	33	1	2	1	0	5049.41	0.059	0	5049.47	3	1.205	0.067	4.644	23.2	4.644	23.2
83	36	3	0	0	1	5321.33	0.321	0.031	5321.68	0	0.154	0.007	4.596	23	1.447	7.2
84	31	2	1	1	1	5438.68	0.288	0.133	5439.1	12	0.11	0.009	7.028	35.1	5.908	29.5
85	44	2	1	1	1	5309.68	0.226	0.18	5310.08	14	0.03	0.001	3.819	19.1	3.811	19.1
86	44	0	3	1	0	4992.06	0.28	0.004	4992.35	23	0	0	6.968	34.8	6.968	34.8
87	43	6	0	1	0	5287.33	0.077	0	5287.4	0	0.026	0.001	1.681	8.4	1.681	8.4
88	38	2	3	0	1	5168.79	0.296	0	5169.08	14	0.001	0	7.663	38.3	3.676	18.4
89	39	1	2	1	1	5334.08	0.394	0	5334.48	7	0.001	0	6.949	34.7	4.118	20.6
90	55	3	2	1	0	5327.94	0.211	0.09	5328.24	13	0.001	0	3.779	18.9	3.779	18.9
91	53	0	2	0	1	5110.34	0.049	0	5110.39	22	0.429	0.019	7.648	38.2	5.157	25.8
92	31	0	1	0	1	5584.1	0.434	0	5584.54	3	0.164	0.011	6.211	31.1	1.49	7.5
93	28	0	2	1	1	5505.39	0.366	0.302	5506.06	12	0.069	0.007	6.709	33.5	6.064	30.3
94	31	3	4	0	1	5100.23	0.074	0.061	5100.37	16	0.42	0.025	10.389	51.9	5.519	27.6
95	37	3	1	0	0	5168.69	0.023	0.019	5168.73	9	0.375	0.017	3.291	16.5	3.291	16.5
96	52	3	1	1	1	5334.85	0.214	0.089	5335.15	4	0.001	0	3.412	17.1	2.067	10.3
97	33	3	2	1	0	5415.66	0.278	0.004	5415.94	10	0	0	3.097	15.5	3.03	15.1
98	41	1	2	1	0	5161.72	0.197	0.193	5162.11	21	0.001	0	4.907	24.5	4.884	24.4
99	35	5	2	1	1	5181.94	0.408	0.054	5182.4	17	0.418	0.022	10.053	50.3	6.544	32.7
100	47	2	0	1	1	5722.93	0.505	0.043	5723.48	10	0.001	0	6.843	34.2	3.565	17.8

Table B-13
Alternative 13 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	25	0	0	0	0	5324.69	1.195	0	5326.11	0	0	0	0	0	0	0
Max	57	5	8	1	1	6824.68	12.455	2.057	6835.16	14	1.363	0.058	11.658	58.3	6.735	33.7
Range	32	5	8	1	1	1499.98	11.26	2.057	1509.05	14	1.363	0.058	11.658	58.3	6.735	33.7
Mean	39.1	2.19	1.9	0.57	0.35	5833.28	7.075	0.80828	5841.16	3.64286	0.09684	0.00418	5.36016	26.801	2.72294	13.6133
St Dev	6.3	1.41	1.22	0.5	0.48	319.214	2.73601	0.50597	320.518	4.7607	0.25308	0.01088	2.39931	11.9934	1.86682	9.33578
RUN																
1	43	2	1	1	0	5348.66	3.8	0.48	5352.94	0	0.001	0	1.68	8.4	0.581	2.9
2	33	0	3	1	0	6088.62	9.125	1.12	6098.86	10	0	0	9.736	48.7	5.372	26.9
3	28	3	2	1	0	5895.19	9.305	0.683	5905.18	2	0	0	7.22	36.1	3.252	16.3
4	36	3	2	1	0	6824.68	9.825	0.657	6835.16	0	0	0	7.968	39.8	2.964	14.8
5	34	2	0	0	0	5341.46	2.105	0.402	5343.97	0	0.001	0	0.844	4.2	0	0
6	57	4	3	1	0	5926.47	12.455	1.683	5940.61	0	0.007	0	8.241	41.2	3.259	16.3
7	37	2	3	1	0	5878.61	11.975	2.057	5892.64	0	0.005	0	8.367	41.8	2.268	11.3
8	48	4	3	0	0	5751.23	9.59	1.807	5762.63	0	0.002	0	6.347	31.7	1.85	9.3
9	29	0	2	1	0	5467.21	3.855	0.052	5471.12	0	0.067	0.004	2.967	14.8	1.888	9.4
10	37	3	0	1	0	5769.14	4.96	0.973	5775.08	10	0.001	0	5.311	26.6	4.16	20.8
11	42	4	4	0	1	5883.12	11.08	1.263	5895.46	4	0.209	0.007	7.057	35.3	3.459	17.3
12	43	0	1	0	0	5513.01	3.085	0.599	5516.69	0	0.14	0.006	2.482	12.4	1.163	5.8
13	37	3	1	1	1	6012.68	4.53	0.335	6017.54	10	0.001	0	5.433	27.2	3.977	19.9
14	37	4	2	0	0	5436.9	6.71	1.323	5444.93	4	0.023	0.001	3.883	19.4	1.378	6.9
15	35	2	0	0	0	5360.36	3.04	0.582	5363.98	0	0.001	0	1.459	7.3	0	0
16	37	3	1	0	0	5551.04	5.685	1.124	5557.85	0	0.001	0	3.664	18.3	0.685	3.4
17	32	4	2	0	0	5769.19	9.765	1.937	5780.89	0	0.001	0	6.458	32.3	1.451	7.3
18	49	2	2	1	0	5628.52	3.99	0.78	5633.29	10	0.001	0	4.886	24.4	3.801	19
19	31	2	8	0	1	6364.34	10.83	1.337	6376.51	5	1.249	0.044	11.658	58.3	6.323	31.6
20	35	0	1	1	0	5914.73	9.075	0.415	5924.22	0	0	0	5.827	29.1	3.844	19.2
21	31	2	1	0	1	5443.43	4.84	0.49	5448.76	0	0.001	0	2.553	12.8	0.72	3.6
22	40	2	1	0	1	5907.05	8.57	0.835	5916.45	0	0.001	0	5.069	25.3	0.441	2.2
23	45	2	3	0	1	5798.14	10.355	1.492	5809.99	1	0.789	0.028	7.916	39.6	2.772	13.9
24	47	0	2	0	0	5556.19	4.49	0.252	5560.94	0	0.001	0	3.173	15.9	1.118	5.6
25	40	3	2	1	0	5555.63	6.61	0.909	5563.15	14	0.001	0	5.117	25.6	2.877	14.4
26	42	2	2	1	0	5684.46	7.285	1.439	5693.18	12	0.002	0	6.648	33.2	4.343	21.7
27	39	3	1	1	0	5449.63	7.155	0.989	5457.78	0	0.001	0	3.625	18.1	0.935	4.7
28	40	3	2	0	0	5664.21	8.175	1.618	5674	0	0.001	0	5.07	25.3	0.665	3.3

Table B-13
Alternative 13 Results

29	45	3	0	1	0	5754.25	3.83	0.76	5758.84	10	0	0	5.55	27.8	4.746	23.7
30	34	2	0	1	0	5826.86	4.735	0	5831.6	0	0	0	0	0	3.242	16.2
31	40	1	1	1	0	5832.03	10.21	1.015	5843.25	10	0	0	6.901	34.5	2.405	12
32	47	2	3	0	1	6437.3	7.48	0.518	6445.3	2	0.001	0	4.984	24.9	1.316	6.6
33	36	2	2	0	1	5666.35	9.345	1.693	5677.39	0	0.001	0	6.093	30.5	1.342	6.7
34	35	5	1	0	1	5926.31	11.285	1.463	5939.06	0	0.001	0	6.227	31.1	0.636	3.2
35	27	3	3	1	1	6227.72	3.39	0	6231.11	6	0.037	0.003	2.484	12.4	4.885	24.4
36	40	1	3	0	0	5407.82	3.11	0.606	5411.54	8	0.001	0	1.796	9	0.979	4.9
37	32	3	0	1	0	5492.42	6.3	0.203	5498.92	0	0	0	2.98	14.9	2.45	12.3
38	25	2	3	0	1	6332.21	8.65	0.984	6341.85	0	0.001	0	5.815	29.1	0.64	3.2
39	47	0	2	1	0	6156.24	6.36	0.506	6163.1	10	0.001	0	7.226	36.1	4.792	24
40	46	1	1	1	0	5620.72	2.005	0	5622.73	0	0	0	0	0	4.131	20.7
41	44	2	3	0	1	5776.37	9.66	0.794	5786.82	0	0.016	0.001	5.638	28.2	1.042	5.2
42	42	2	0	1	0	5611.03	7.085	0.151	5618.27	0	0.001	0	3.917	19.6	2.694	13.5
43	53	1	0	1	0	5818.81	2.605	0.514	5821.93	0	0.885	0.037	5.833	29.2	3.931	19.7
44	43	1	2	0	1	5595.04	5.805	0.556	5601.4	0	0.079	0.003	5.198	26	1.398	7
45	31	1	1	0	0	5385.6	2.73	0.09	5388.42	0	0.001	0	1.993	10	0.24	1.2
46	39	0	3	1	1	5924.98	11.195	0.743	5936.92	0	0.001	0	6.913	34.6	3.103	15.5
47	41	4	1	0	1	5601.71	7.915	0.939	5610.57	0	0.001	0	4.194	21	0.48	2.4
48	39	5	0	1	0	5377.89	5.145	0.764	5383.8	0	0.001	0	2.377	11.9	0.234	1.2
49	44	4	2	0	1	5943.52	11.585	1.427	5956.53	2	0.001	0	6.34	31.7	1.016	5.1
50	33	0	1	1	0	5683.53	8.735	0.553	5692.82	0	0.001	0	4.667	23.3	3.299	16.5
51	31	3	2	1	0	6287.55	9.035	0.733	6297.32	12	0.136	0.008	8.696	43.5	6.424	32.1
52	31	3	3	0	1	6270.86	11.47	1.101	6283.43	0	0.001	0	7.958	39.8	1.125	5.6
53	42	0	2	1	0	5826	4.88	0	5830.88	0	0	0	4.768	23.8	2.2	11
54	47	3	1	0	1	5491.79	7.385	1.229	5500.4	0	0.001	0	4.11	20.5	0.907	4.5
55	38	2	2	1	0	5750.58	6.265	1.039	5757.88	12	0.044	0.003	5.173	25.9	4.509	22.5
56	37	5	2	0	1	5710.21	10.05	1.476	5721.74	6	0.036	0.001	5.498	27.5	1.744	8.7
57	44	2	2	1	1	6276.86	7.525	0.945	6285.33	0	0.148	0.007	6.798	34	2.721	13.6
58	36	1	1	0	0	5364.44	2.64	0.525	5367.6	0	0.02	0.001	1.553	7.8	0.672	3.4
59	28	4	1	0	0	5422.7	4.33	0.447	5427.48	2	0.001	0	2.611	13.1	0.738	3.7
60	38	1	2	0	1	6177.37	5.485	0.224	6183.08	2	0.284	0.012	4.334	21.7	1.297	6.5
61	41	1	2	1	1	6345.71	9	1.782	6356.49	12	0.001	0	9.599	48	5.16	25.8
62	42	1	1	0	0	5435.95	2.72	0.525	5439.19	0	0.001	0	1.944	9.7	0	0
63	29	4	1	1	0	5803.86	12.09	1.049	5817	0	0	0	6.854	34.3	3.06	15.3
64	40	0	1	1	0	5887.07	6.37	0.562	5894	0	0	0	1.898	9.5	3.768	18.8
65	40	2	3	1	1	6473.82	8.09	0.745	6482.65	10	0.001	0	7.177	35.9	3.439	17.2
66	30	3	3	1	0	5891.29	8.565	1.709	5901.56	0	0.695	0.033	9.41	47	5.005	25

Table B-13
Alternative 13 Results

67	40	2	1	1	0	5994.35	4.36	0.626	5999.33	10	0	0	7.168	35.8	5.502	27.5
68	27	1	2	0	1	6099.04	6.31	0.284	6105.63	0	0.001	0	3.744	18.7	0	0
69	37	1	1	1	0	6114.26	4.68	0.016	6118.95	0	0.737	0.048	6.939	34.7	5.859	29.3
70	46	3	3	1	1	6507.42	8.01	0.918	6516.35	1	0.401	0.014	6.373	31.9	2.889	14.4
71	40	5	4	1	0	6070.24	7.88	1.569	6079.69	4	0.615	0.028	8.297	41.5	6.166	30.8
72	42	5	2	1	1	5768.74	8.845	0.807	5778.39	6	0.001	0	4.348	21.7	1.088	5.4
73	32	4	3	1	0	5801.73	8.11	0.832	5810.67	10	0.001	0	7.945	39.7	3.713	18.6
74	39	1	2	1	0	5798.32	8.385	1.659	5808.36	10	0	0	6.673	33.4	4.086	20.4
75	44	0	2	1	0	6002.58	4.095	0.482	6007.15	0	0	0	1.66	8.3	4.401	22
76	27	1	2	0	0	5604.3	5.81	1.147	5611.25	0	0.092	0.005	5.26	26.3	1.348	6.7
77	41	1	1	1	0	6137.35	3.905	0.019	6141.27	10	0.001	0	5.541	27.7	4.663	23.3
78	39	3	3	1	0	6334.44	9.09	0.812	6344.34	13	0.001	0	9.817	49.1	6.735	33.7
79	49	3	3	0	0	5556.16	4.56	0.676	5561.4	4	0.012	0	3.838	19.2	2.163	10.8
80	36	3	3	1	0	5903.35	7.045	1.111	5911.51	14	0.352	0.017	7.695	38.5	6.573	32.9
81	41	1	4	0	0	5564.93	7.685	0.974	5573.59	3	0.524	0.021	5.487	27.4	3.363	16.8
82	37	4	3	1	0	6027.25	11.15	1.68	6040.08	10	0.001	0	10.284	51.4	6.31	31.6
83	35	5	2	1	1	6139.38	10.685	0.972	6151.04	2	0.066	0.004	8.146	40.7	2.647	13.2
84	44	4	0	1	0	5569.79	4.895	0.6	5575.28	10	0.001	0	4.76	23.8	3.18	15.9
85	48	1	3	1	0	5652.17	6.765	0.638	5659.57	13	1.363	0.058	6.232	31.2	3.639	18.2
86	45	0	2	1	1	5689.15	6.72	0	5695.87	6	0.099	0.004	4.797	24	3.668	18.3
87	30	3	2	1	1	5719.54	7.435	0.076	5727.05	0	0.056	0.003	5.031	25.2	4.639	23.2
88	37	1	3	0	1	5956.52	7.05	0.63	5964.2	1	0.251	0.009	6.094	30.5	2.04	10.2
89	38	2	1	0	0	5324.69	1.195	0.22	5326.11	0	0.001	0	0.513	2.6	0.05	0.2
90	38	3	4	0	1	5805.49	9.85	1.058	5816.39	6	0.001	0	6.494	32.5	1.705	8.5
91	44	3	2	1	0	5655.08	8.465	0.782	5664.32	0	0.001	0	2.867	14.3	3.311	16.6
92	47	1	3	1	0	6429.19	8.11	0.835	6438.14	10	0	0	9.95	49.7	6.277	31.4
93	44	1	1	1	0	6470.53	9.145	0.798	6480.47	10	0.001	0	8.468	42.3	5.577	27.9
94	50	3	3	0	1	5898.71	8.48	0.658	5907.84	0	0.001	0	6.615	33.1	1.286	6.4
95	37	1	2	0	0	5506.56	4.76	0.933	5512.25	2	0.001	0	3.636	18.2	0.603	3
96	38	3	2	1	0	5827.73	4.175	0.355	5832.26	14	0.001	0	6.346	31.7	4.594	23
97	52	1	1	0	1	5845.64	7.79	0.687	5854.12	0	0.001	0	4.227	21.1	0.72	3.6
98	37	1	2	0	1	6314.42	7.975	0.576	6322.97	0	0.001	0	4.633	23.2	0	0
99	43	1	2	1	0	5821.88	11.05	1.177	5834.11	2	0.001	0	6.841	34.2	4.027	20.1
100	41	1	0	1	0	5589.07	4.485	0.201	5593.76	10	0	0	3.827	19.1	2.663	13.3

Table 14
Alternative 14 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	18	0	0	0	0	5300.86	1.69	0.068	5302.87	0	0	0	0.224	1.1	0	0
Max	58	5	7	1	1	7084.44	14.85	1.425	7100.23	14	0.519	0.034	11.153	55.8	6.325	31.6
Range	40	5	7	1	1	1783.58	13.16	1.357	1797.36	14	0.519	0.034	10.929	54.7	6.325	31.6
Mean	39.2	1.85	1.96	0.65	0.36	6079.33	6.83546	0.67783	6086.84	4.45918	0.03806	0.00193	5.49292	27.4663	2.54704	12.7357
St Dev	7.03	1.3	1.26	0.48	0.48	400.961	2.31421	0.30707	402.283	4.81559	0.09615	0.00561	2.1888	10.9457	1.73979	8.70319
RUN																
1	43	2	1	1	0	5339.19	4.12	0.559	5343.87	0	0.001	0	1.412	7.1	0.581	2.9
2	33	0	3	1	0	6366.61	8.17	0.937	6375.72	10	0	0	8.92	44.6	4.836	24.2
3	28	3	2	1	0	6010.88	9.21	0.671	6020.76	2	0	0	7.156	35.8	3.263	16.3
4	36	3	2	1	0	6915.06	9.675	0.253	6924.99	0	0	0	7.775	38.9	2.76	13.8
5	34	2	0	0	0	5363.42	2.785	0.555	5366.76	0	0.001	0	0.762	3.8	0	0
6	57	4	3	1	0	6433.58	11.275	1.117	6445.97	0	0.007	0	7.598	38	1.988	9.9
7	37	2	3	1	0	6454.36	9.135	1.425	6464.92	0	0.001	0	6.646	33.2	1.208	6
8	48	4	3	0	0	6190.64	7.355	1.367	6199.36	0	0.003	0	5.349	26.7	1.626	8.1
9	29	0	2	1	0	5438.8	4.455	0.157	5443.41	0	0.071	0.004	2.967	14.8	1.892	9.5
10	37	3	0	1	0	5949.32	4.865	0.86	5955.05	10	0.001	0	5.254	26.3	4.16	20.8
11	42	4	4	0	1	6110.51	10.05	1.06	6121.62	4	0.198	0.007	6.514	32.6	3.404	17
12	43	0	1	0	0	5696.59	3.535	0.705	5700.83	0	0.14	0.006	2.482	12.4	1.163	5.8
13	41	2	1	1	1	6051.25	5.625	0.38	6057.25	10	0.001	0	5.321	26.6	3.231	16.2
14	43	5	1	1	0	5938.64	4.215	0.825	5943.68	10	0.001	0	6.714	33.6	4.7	23.5
15	39	2	2	1	0	6136.25	7.58	0.902	6144.74	10	0.001	0	6.8	34	3.191	16
16	35	1	3	0	1	6433.84	8.71	0.856	6443.41	4	0.001	0	6.537	32.7	1.273	6.4
17	45	1	3	1	0	6088.74	8.89	0.628	6098.26	0	0.001	0	6.196	31	0.725	3.6
18	44	2	0	1	0	5497.61	4.77	0.274	5502.65	10	0.001	0	3.265	16.3	2.372	11.9
19	37	1	5	1	0	6203.22	3.61	0.704	6207.54	14	0.001	0	7.908	39.5	5.277	26.4
20	32	1	2	0	1	6150.63	8.135	0.734	6159.5	0	0.001	0	5.293	26.5	0.54	2.7
21	35	2	3	0	1	6306.38	9.735	0.974	6317.08	0	0.001	0	5.526	27.6	0.495	2.5
22	40	2	3	1	0	6173.62	8.815	0.958	6183.39	10	0	0	8.212	41.1	4.498	22.5
23	42	0	3	0	1	5981.53	6.925	0.541	5989	4	0.001	0	4.874	24.4	0.622	3.1
24	36	5	2	1	0	6137.76	6.235	0.351	6144.35	10	0.001	0	6.637	33.2	3.591	18
25	33	3	2	0	0	5790.07	6.36	0.789	5797.21	5	0.001	0	4.947	24.7	0.841	4.2
26	27	3	3	1	1	6628.69	5.085	0.37	6634.14	2	0.354	0.023	6.807	34	2.619	13.1
27	45	1	2	1	0	5696.7	5.135	0.932	5702.76	3	0.254	0.01	3.483	17.4	1.429	7.1
28	36	0	1	0	1	6474.98	8.025	0.599	6483.6	0	0.001	0	3.876	19.4	0	0

Table 14
Alternative 14 Results

29	37	1	3	1	0	5958.54	7.59	0.883	5967.01	2	0.012	0	5.042	25.2	2.739	13.7
30	33	2	1	1	1	5886.78	10.14	0.78	5897.7	0	0.134	0.007	5.589	27.9	2.593	13
31	37	2	0	1	0	5716.94	7.83	0.707	5725.48	10	0.001	0	4.546	22.7	2.326	11.6
32	42	2	3	1	1	6860.1	10.975	0.376	6871.45	2	0.04	0.002	7.45	37.2	1.909	9.5
33	43	0	2	1	0	6853.41	7.145	0.39	6860.94	1	0.051	0.003	4.69	23.5	3.152	15.8
34	49	3	1	1	0	6173.8	6.62	0.884	6181.31	10	0.001	0	6.589	32.9	4	20
35	40	1	1	1	0	5704.18	4.22	0.068	5708.47	10	0.001	0	5.16	25.8	3.961	19.8
36	44	0	1	0	0	5588.8	3.615	0.721	5593.13	0	0.001	0	2.283	11.4	0	0
37	32	0	3	0	1	5701.93	5.835	0.284	5708.05	2	0.001	0	3.132	15.7	0.722	3.6
38	41	1	1	1	0	5505.63	4.1	0.571	5510.3	0	0.001	0	2.07	10.3	0.188	0.9
39	35	1	2	1	0	6334.49	5.915	0.536	6340.94	10	0.001	0	7.997	40	4.196	21
40	31	3	2	1	1	7084.44	14.85	0.941	7100.23	4	0	0	8.839	44.2	3.442	17.2
41	32	1	1	1	1	5803.14	7.035	0.63	5810.8	0	0.001	0	4.058	20.3	0.586	2.9
42	48	0	1	1	0	6321.07	6.735	0.432	6328.23	0	0	0	1.91	9.5	3.092	15.5
43	45	4	2	1	0	6417.87	6.865	1.276	6426.01	10	0.001	0	7.56	37.8	4.066	20.3
44	46	3	2	0	0	5753.09	6.565	0.793	5760.45	0	0.001	0	4.676	23.4	0.204	1
45	37	4	4	1	0	6279.02	7.465	1.137	6287.63	14	0.001	0	8.693	43.5	5.37	26.8
46	28	2	3	1	1	6643.75	5.5	0.123	6649.38	10	0	0	9.514	47.6	3.355	16.8
47	29	1	0	1	0	5323.65	2.675	0.346	5326.67	0	0	0	0.923	4.6	0.403	2
48	30	3	0	1	0	6135.67	5.27	0.511	6141.46	10	0	0	6.996	35	5.652	28.3
49	35	1	1	1	0	6282.5	4.885	0.072	6287.46	10	0.001	0	6.917	34.6	5.793	29
50	34	1	2	1	0	5908.82	8.65	0.719	5918.19	0	0	0	5.359	26.8	1.28	6.4
51	40	3	0	1	0	5695.92	2.765	0.55	5699.24	10	0.001	0	5.483	27.4	3.723	18.6
52	31	2	3	1	1	6214.83	5.795	0.472	6221.1	10	0.001	0	6.875	34.4	3.92	19.6
53	44	1	1	1	0	6177.84	8.38	0.755	6186.98	10	0.001	0	5.066	25.3	2.394	12
54	43	3	5	1	0	6353	8.16	1.31	6362.47	8	0.128	0.005	5.844	29.2	2.055	10.3
55	30	1	3	0	1	6531.18	7.1	0.425	6538.71	5	0.041	0.002	4.552	22.8	1.826	9.1
56	39	3	1	1	0	6236.61	6.895	0.814	6244.32	14	0.001	0	7.277	36.4	5.499	27.5
57	32	2	1	0	1	6246.61	7.885	0.544	6255.04	0	0	0	4.465	22.3	1.031	5.2
58	46	2	2	1	0	5979.23	5.015	0.624	5984.87	1	0.101	0.004	1.957	9.8	4.967	24.8
59	44	3	1	1	0	5937.22	7.895	0.705	5945.82	0	0	0	4.535	22.7	2.237	11.2
60	42	1	3	1	0	5860.99	4.035	0.56	5865.58	10	0	0	6.655	33.3	4.282	21.4
61	39	0	2	1	1	6377.7	6.985	0.115	6384.8	0	0.106	0.005	6.088	30.4	2.848	14.2
62	40	0	1	1	1	6111	10.725	0.529	6122.26	0	0.001	0	6.405	32	2.125	10.6
63	53	3	1	0	1	5709.99	7.26	0.541	5717.79	0	0.001	0	3.154	15.8	0	0
64	39	3	4	1	0	6506.94	8.22	1.102	6516.26	10	0.001	0	8.584	42.9	3.678	18.4
65	43	0	1	0	1	5491.88	5.03	0.137	5497.05	0	0.001	0	2.881	14.4	0.671	3.4
66	44	1	1	1	0	6001.09	8.94	0.72	6010.75	10	0	0	6.01	30.1	3.435	17.2

Table 14
Alternative 14 Results

67	38	3	2	1	0	6318.69	5.84	0.428	6324.96	12	0	0	8.098	40.5	6.325	31.6
68	47	1	1	0	1	5646.18	7.205	0.614	5654	0	0.001	0	3.172	15.9	0.047	0.2
69	28	1	2	1	1	6577.87	8.32	0.709	6586.9	10	0.001	0	7.663	38.3	3.44	17.2
70	39	2	2	0	0	5906.39	5.005	1.001	5912.4	1	0.001	0	3.807	19	1.363	6.8
71	48	2	2	1	0	6152.2	8.03	0.739	6160.97	7	0.296	0.01	4.52	22.6	4.412	22.1
72	38	0	2	0	0	5948.28	5.945	1.188	5955.41	0	0.081	0.003	4.181	20.9	1.362	6.8
73	38	3	1	1	0	6912.32	8.185	0.666	6921.18	0	0.019	0.001	8.024	40.1	3.168	15.8
74	39	2	3	0	1	5959.35	8.19	1.082	5968.62	4	0.001	0	4.872	24.4	1.204	6
75	33	2	2	0	1	5673.14	5.61	0.892	5679.64	0	0.001	0	3.694	18.5	1.099	5.5
76	49	1	1	1	1	6268.93	5.465	0.507	6274.9	10	0.001	0	8.162	40.8	3.222	16.1
77	58	2	1	0	1	5477.97	5.11	0.289	5483.37	0	0.001	0	2.378	11.9	0.979	4.9
78	42	4	2	1	0	6281.67	7.785	0.538	6289.99	13	0.131	0.007	8.793	44	5.317	26.6
79	48	1	3	0	0	5862.69	5.27	1.052	5869.01	3	0.053	0.002	3.712	18.6	1.598	8
80	47	1	2	0	1	5454.03	4.14	0.494	5458.67	4	0.001	0	1.637	8.2	0.733	3.7
81	41	1	2	1	0	5879.78	3.385	0.67	5883.84	10	0.028	0.001	6.069	30.3	3.605	18
82	26	3	2	0	1	6845.94	8.41	0.667	6855.02	0	0.001	0	5.612	28.1	0.789	3.9
83	36	1	2	1	0	6087.89	6.905	0.449	6095.24	10	0.001	0	5.008	25	3.053	15.3
84	33	0	2	1	0	6557.27	7.735	0.868	6565.87	0	0.293	0.023	8.265	41.3	5.41	27.1
85	46	3	4	0	1	6236.62	9.185	0.989	6246.79	1	0.075	0.002	6.136	30.7	2.065	10.3
86	47	5	2	1	0	6163.14	13.75	0.824	6177.71	0	0.019	0.001	7.989	39.9	5.065	25.3
87	25	1	3	1	0	6391.93	7.82	0.77	6400.52	10	0	0	6.475	32.4	3.416	17.1
88	41	1	2	0	0	5772.86	6.14	1.22	5780.22	0	0.001	0	3.577	17.9	0.499	2.5
89	42	3	0	0	1	5404.52	5.37	0.882	5410.77	0	0.001	0	2.116	10.6	0	0
90	45	1	1	1	0	6282.81	3.785	0.421	6287.02	10	0	0	8.264	41.3	4.545	22.7
91	39	4	2	1	0	7011.8	5.82	0.716	7018.34	0	0.488	0.026	11.153	55.8	5.674	28.4
92	48	1	0	0	0	5300.86	1.69	0.322	5302.87	0	0.001	0	0.224	1.1	0	0
93	49	2	4	1	0	6183.34	7.88	1.041	6192.26	11	0.011	0	7.719	38.6	5.249	26.2
94	42	0	2	1	0	6219.55	9.865	0.475	6229.89	0	0	0	7.763	38.8	3.114	15.6
95	39	1	7	0	1	6017.9	7.375	0.311	6025.59	7	0.025	0.001	6.782	33.9	2.486	12.4
96	49	0	2	0	0	5825.25	4.5	0.896	5830.65	0	0.001	0	2.961	14.8	0.815	4.1
97	41	3	0	0	1	5589.6	6.825	0.453	5596.88	0	0.001	0	3.018	15.1	0	0
98	29	1	1	1	0	5598	3.97	0.732	5602.7	10	0	0	3.831	19.2	2.754	13.8
99	18	3	4	1	1	6288.09	8.61	0.28	6296.98	3	0.519	0.034	7.317	36.6	5.032	25.2
100	38	2	2	0	1	5754.74	9	1.172	5764.91	0	0.001	0	4.591	23	1.182	5.9

Table B-15
Alternative 15 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	28	0	0	0	0	4692.76	0	0	4692.99	0	0	0	0	0	0	0
Max	55	6	6	1	1	6057.84	0.918	0.52	6058.64	45	1.868	0.094	16.243	81.2	9.163	45.8
Range	27	6	6	1	1	1365.08	0.918	0.52	1365.65	45	1.868	0.094	16.243	81.2	9.163	45.8
Mean	39.9	1.73	2.02	0.53	0.53	5267.48	0.29443	0.04814	5267.83	12.898	0.20356	0.01098	7.68752	38.4378	4.30188	21.5112
St Dev	6.43	1.42	1.29	0.5	0.5	243.576	0.23584	0.10431	243.762	8.7785	0.30576	0.01658	3.31683	16.5851	2.33893	11.697
RUN																
1	43	2	1	1	0	5294.84	0.103	0.041	5294.99	0	0.001	0	2.492	12.5	0.581	2.9
2	38	0	3	1	0	5283.73	0.571	0.019	5284.32	16	1.054	0.059	11.019	55.1	7.665	38.3
3	42	1	1	0	1	5267.5	0.123	0.038	5267.66	1	0.035	0.002	5.674	28.4	0.714	3.6
4	32	2	3	0	1	5260.43	0.083	0.022	5260.54	6	0.189	0.011	4.056	20.3	2.611	13.1
5	43	0	0	1	0	5319.75	0.173	0.17	5320.09	10	0.001	0	1.886	9.4	1.886	9.4
6	44	1	3	0	0	4926.98	0	0	4926.98	19	0.001	0	5.92	29.6	5.525	27.6
7	52	2	5	0	0	4701.31	0.287	0	4701.6	45	0.039	0.002	8.089	40.4	7.641	38.2
8	44	0	1	1	1	5133.56	0.269	0	5133.83	21	0.002	0	7.601	38	4.684	23.4
9	54	2	2	1	0	5113.97	0.248	0.245	5114.47	13	0.932	0.042	6.149	30.7	5.93	29.6
10	51	0	2	1	1	5075.36	0.159	0	5075.52	22	0.016	0.001	8.551	42.8	5.642	28.2
11	46	1	2	1	0	5143.92	0.118	0.042	5144.08	15	0.409	0.018	7.758	38.8	6.091	30.5
12	38	0	1	1	1	5515.98	0.523	0.52	5517.02	10	0	0	5.916	29.6	2.312	11.6
13	45	0	5	0	0	5111.13	0.154	0	5111.28	19	1.868	0.094	6.865	34.3	7.177	35.9
14	36	2	1	1	0	5628.96	0.732	0.061	5629.76	10	0.001	0	9.075	45.4	2.784	13.9
15	49	1	2	1	0	5538.79	0.614	0.019	5539.42	10	0.098	0.004	9.935	49.7	5.769	28.8
16	37	2	5	0	0	4951.79	0.109	0.042	4951.95	24	0.179	0.01	8.304	41.5	6.665	33.3
17	35	2	6	0	0	4838.65	0.311	0	4838.96	21	0.94	0.054	10.496	52.5	8.738	43.7
18	35	0	2	0	0	5167.1	0.368	0	5167.47	13	0	0	2.994	15	2.994	15
19	28	5	2	1	0	5354.88	0.432	0.019	5355.33	14	0.892	0.054	15.115	75.6	5.889	29.4
20	33	0	3	1	1	5084.86	0.178	0	5085.04	15	0.335	0.031	6.818	34.1	5.674	28.4
21	50	2	1	0	0	5126.83	0.15	0	5126.98	7	0.001	0	3.225	16.1	2.627	13.1
22	36	0	3	1	1	5414.9	0.639	0	5415.54	18	0.014	0.001	13.26	66.3	8.088	40.4
23	42	2	0	1	1	5414.23	0.549	0.189	5414.96	10	0.001	0	6.969	34.8	1.867	9.3
24	39	3	2	1	1	5153.66	0.036	0	5153.7	19	0	0	6.535	32.7	5.521	27.6
25	38	4	2	1	1	5456.04	0.622	0.227	5456.89	12	0.047	0.002	10.122	50.6	5.18	25.9
26	36	0	2	0	1	5520.76	0.586	0	5521.35	1	0.353	0.017	12.876	64.4	3.03	15.2
27	38	1	2	0	0	4946.72	0.283	0	4947	16	0	0	5.168	25.8	4.922	24.6
28	48	3	1	0	1	5388.55	0.419	0.112	5389.08	2	0.001	0	6.631	33.2	0.842	4.2

Table B-15
Alternative 15 Results

29	45	2	1	0	0	5238.76	0.004	0	5238.77	4	0.334	0.012	4.226	21.1	1.898	9.5
30	44	4	2	0	1	5086.72	0.067	0	5086.79	9	0.245	0.009	8.065	40.3	3.019	15.1
31	46	1	1	1	1	5303.2	0.533	0	5303.73	5	0.595	0.027	9.721	48.6	5.954	29.8
32	38	3	3	0	1	5384.32	0.567	0	5384.89	15	0.039	0.002	13.287	66.4	4.274	21.4
33	30	1	0	1	1	5427.18	0.439	0	5427.62	0	0.001	0	6.144	30.7	0.116	0.6
34	36	1	3	1	0	5344.56	0.461	0.019	5345.04	22	0.505	0.031	14.628	73.1	8.05	40.3
35	42	0	0	0	0	5288.42	0.003	0	5288.42	0	0.001	0	0	0	0	0
36	41	0	1	0	0	5261.17	0.004	0	5261.18	3	0.273	0.013	1.823	9.1	1.078	5.4
37	39	1	1	1	1	5676.75	0.647	0	5677.4	8	0.259	0.012	11.206	56	2.285	11.4
38	40	2	2	1	0	5351.85	0.37	0.019	5352.24	10	0.134	0.007	7.212	36.1	4.258	21.3
39	49	4	2	1	1	4982.03	0.08	0	4982.11	18	0.218	0.012	4.688	23.4	8.774	43.9
40	40	1	3	1	0	5101.13	0.154	0	5101.28	9	0.885	0.048	6.532	32.7	6.153	30.8
41	32	3	1	0	1	5334.87	0.312	0.023	5335.21	7	0.11	0.005	6.675	33.4	1.89	9.4
42	43	2	0	0	1	5469.75	0.452	0.023	5470.22	0	0.001	0	7.029	35.1	0	0
43	35	0	4	0	1	5311.86	0.675	0	5312.53	20	0.353	0.023	16.243	81.2	4.488	22.4
44	29	0	2	0	0	5054.67	0.004	0	5054.67	5	0.264	0.016	4.822	24.1	4.278	21.4
45	30	2	1	0	1	5120.88	0.374	0	5121.26	9	0.034	0.002	10.142	50.7	2.829	14.1
46	34	2	2	1	0	5186.99	0.309	0.292	5187.59	16	0.001	0	7.418	37.1	5.757	28.8
47	28	4	4	0	1	4832.31	0.206	0	4832.51	24	0.132	0.01	9.17	45.8	6.512	32.6
48	48	3	2	1	1	5152.18	0.045	0.057	5152.29	28	0.037	0.002	5.92	29.6	5.731	28.7
49	34	2	3	0	1	5326.27	0.122	0	5326.39	12	0.197	0.01	8.423	42.1	3.091	15.5
50	44	2	3	1	0	5008.69	0.045	0	5008.73	25	0.143	0.008	11.463	57.3	8.069	40.3
51	35	0	1	1	1	5438.31	0.53	0.519	5439.36	15	0.549	0.044	8.014	40.1	5.452	27.3
52	40	1	2	0	1	5302.31	0.203	0	5302.51	2	0.135	0.006	5.004	25	1.698	8.5
53	35	1	1	1	1	5384.33	0.593	0.019	5384.95	16	0.001	0	9.181	45.9	3.967	19.8
54	37	0	4	0	0	5102.09	0.113	0	5102.2	17	0.253	0.015	4.595	23	4.756	23.8
55	51	2	1	0	1	5469.01	0.566	0.042	5469.62	1	0.019	0.001	9.236	46.2	0.735	3.7
56	32	2	2	0	0	5158.58	0.037	0	5158.61	8	0.001	0	3.15	15.7	2.236	11.2
57	31	4	1	0	0	5263.08	0.003	0	5263.09	4	0.238	0.012	4.152	20.8	1.809	9
58	34	5	2	1	1	5027.7	0.105	0	5027.81	11	1.186	0.064	7.449	37.2	4.335	21.7
59	42	1	0	0	1	5839.95	0.871	0.019	5840.84	0	0.001	0	10.735	53.7	0.287	1.4
60	46	3	4	1	1	5475.93	0.559	0.057	5476.55	27	0.091	0.005	11.6	58	6.305	31.5
61	38	0	2	1	0	5565.5	0.574	0.019	5566.09	25	0.037	0.003	12.023	60.1	6.192	31
62	38	1	2	1	0	5274.81	0.491	0.019	5275.32	18	0.564	0.035	8.344	41.7	5.466	27.3
63	38	3	4	1	1	5177.94	0.1	0.019	5178.06	26	0.048	0.003	12.419	62.1	8.139	40.7
64	46	1	2	0	0	5061.47	0.048	0	5061.52	9	0.209	0.011	5.409	27	3.95	19.7
65	35	0	1	1	1	6057.84	0.795	0	6058.64	0	0.001	0	11.95	59.8	0.183	0.9
66	37	2	1	0	0	5287.09	0.041	0.038	5287.16	4	0.001	0	1.911	9.6	0.428	2.1

Table B-15
Alternative 15 Results

67	46	3	0	0	0	5278.1	0.023	0.019	5278.15	8	0.245	0.011	1.509	7.5	1.108	5.5
68	44	2	4	1	0	4908.82	0.115	0	4908.94	21	0.001	0	9.687	48.4	7.832	39.2
69	50	2	3	1	1	5307.47	0.28	0.076	5307.82	24	0.329	0.014	9.242	46.2	5.12	25.6
70	44	2	1	1	0	5349.78	0.37	0.378	5350.53	13	0.288	0.019	6.571	32.9	5.979	29.9
71	43	2	3	0	0	5075.38	0.333	0	5075.72	18	0.005	0	4.639	23.2	5.337	26.7
72	36	4	2	0	1	5287.27	0.195	0	5287.46	1	0.169	0.008	8.76	43.8	2.709	13.5
73	37	2	4	1	1	5384.59	0.142	0.303	5385.04	22	0.14	0.008	9.073	45.4	7.778	38.9
74	42	2	3	1	0	5719.27	0.689	0.019	5719.98	14	0.459	0.019	10.796	54	3.506	17.5
75	38	3	1	1	1	5282.2	0.046	0.019	5282.26	5	0.002	0	1.539	7.7	2.875	14.4
76	37	2	4	0	1	4835.4	0.055	0.019	4835.47	23	0.001	0	7.1	35.5	5.958	29.8
77	45	1	2	0	0	5079.44	0.004	0	5079.44	12	0.128	0.006	6.299	31.5	4.663	23.3
78	39	3	3	0	0	4692.76	0.223	0	4692.99	30	0.669	0.048	11.826	59.1	8.761	43.8
79	37	0	2	1	1	5179.88	0.479	0.019	5180.38	25	0.376	0.023	12.096	60.5	6.725	33.6
80	28	1	3	1	0	4933.8	0.081	0	4933.88	27	0	0	9.299	46.5	9.163	45.8
81	45	5	1	1	0	5124.67	0.04	0.061	5124.77	17	0.746	0.028	8.581	42.9	4.6	23
82	33	1	2	1	0	5221.06	0.058	0	5221.12	3	0.492	0.027	4.966	24.8	3.931	19.7
83	36	3	0	0	1	5344.94	0.325	0.038	5345.3	0	0.068	0.003	6.435	32.2	1.152	5.8
84	30	2	1	1	1	5562.53	0.408	0.019	5562.96	12	0.035	0.003	10.079	50.4	5.665	28.3
85	46	2	3	0	0	5160.73	0.003	0	5160.74	19	0.026	0.001	3.378	16.9	3.057	15.3
86	42	0	2	1	0	5425.56	0.351	0.359	5426.27	13	0.002	0	5.821	29.1	5.404	27
87	43	6	0	1	0	5304.31	0.181	0.098	5304.59	0	0.001	0	5.825	29.1	1.358	6.8
88	38	2	3	0	1	5180.21	0.305	0	5180.52	13	0.005	0	8.91	44.6	3.538	17.7
89	39	1	2	1	1	5413.49	0.625	0.038	5414.15	5	0.001	0	10.676	53.4	4.118	20.6
90	55	3	2	1	0	5343.86	0.344	0.094	5344.3	14	0.053	0.002	6.176	30.9	3.753	18.8
91	53	0	2	0	1	5124.65	0.032	0	5124.68	23	0.311	0.014	8.382	41.9	5.517	27.6
92	31	0	1	0	1	5668.97	0.748	0	5669.72	2	0.149	0.01	10.131	50.7	1.475	7.4
93	34	0	2	1	1	5574.23	0.244	0.019	5574.49	14	0.147	0.012	8.712	43.6	6.238	31.2
94	38	3	2	1	1	5629.91	0.288	0.019	5630.21	14	0.001	0	3.599	18	5.266	26.3
95	42	2	2	1	1	5075.05	0.152	0	5075.2	10	0.033	0.002	10.334	51.7	5.5	27.5
96	47	5	2	1	0	5263.69	0.217	0.189	5264.09	20	0.362	0.015	8.408	42	5.117	25.6
97	46	0	3	0	1	5444.24	0.497	0	5444.73	14	0.255	0.012	11.96	59.8	4.531	22.7
98	29	1	0	1	1	5920.36	0.918	0	5921.28	0	0	0	10.606	53	4.171	20.9
99	45	1	3	0	1	5142.73	0.374	0	5143.1	23	0	0	4.971	24.9	4.434	22.2
100	37	2	0	0	0	5286.91	0.042	0.042	5287	0	0.001	0	0.994	5	0	0

Table B-16
Alternative 16 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	28	0	0	0	0	4692.76	0	0	4692.99	0	0	0	0	0	0	0
Max	55	6	6	1	1	6057.84	0.918	0.387	6058.64	45	1.868	0.094	16.243	81.2	9.163	45.8
Range	27	6	6	1	1	1365.08	0.918	0.387	1365.65	45	1.868	0.094	16.243	81.2	9.163	45.8
Mean	39.9	1.73	2.02	0.53	0.53	5274.48	0.30001	0.0382	5274.82	12.8673	0.20197	0.01089	7.69445	38.4704	4.27585	21.3796
St Dev	6.43	1.42	1.29	0.5	0.5	249.265	0.23426	0.07	249.444	8.72794	0.30512	0.01655	3.3096	16.5473	2.31191	11.5601
RUN																
1	43	2	1	1	0	5292.29	0.136	0.082	5292.51	0	0.001	0	2.492	12.5	0.581	2.9
2	38	0	3	1	0	5289.73	0.569	0.004	5290.3	16	1.054	0.059	11.019	55.1	7.665	38.3
3	42	1	1	0	1	5268.56	0.142	0.057	5268.75	1	0.035	0.002	5.667	28.3	0.714	3.6
4	32	2	3	0	1	5260.39	0.096	0.035	5260.52	6	0.189	0.011	4.056	20.3	2.611	13.1
5	43	0	0	1	0	5330.31	0.187	0.184	5330.68	10	0.001	0	1.886	9.4	1.886	9.4
6	44	1	3	0	0	4926.98	0	0	4926.98	19	0.001	0	5.92	29.6	5.525	27.6
7	52	2	5	0	0	4699.3	0.275	0.004	4699.58	45	0.039	0.002	8.049	40.2	7.626	38.1
8	44	0	1	1	1	5133.56	0.269	0	5133.83	21	0.002	0	7.601	38	4.684	23.4
9	54	2	2	1	0	5145.52	0.248	0.246	5146.01	13	0.932	0.042	6.149	30.7	5.93	29.6
10	51	0	2	1	1	5075.27	0.165	0.006	5075.44	22	0.016	0.001	8.551	42.8	5.642	28.2
11	46	1	2	1	0	5144.39	0.114	0.045	5144.55	15	0.409	0.018	7.758	38.8	6.091	30.5
12	38	0	1	1	1	5599.52	0.523	0.214	5600.26	10	0	0	5.916	29.6	2.312	11.6
13	45	0	5	0	0	5111.13	0.154	0	5111.28	19	1.868	0.094	6.865	34.3	7.177	35.9
14	36	2	1	1	0	5637.99	0.753	0.07	5638.81	10	0.001	0	9.075	45.4	2.784	13.9
15	49	1	2	1	0	5545.52	0.612	0.004	5546.13	10	0.098	0.004	9.935	49.7	5.769	28.8
16	37	2	5	0	0	4951.42	0.099	0.052	4951.57	24	0.179	0.01	8.304	41.5	6.665	33.3
17	35	2	6	0	0	4838.65	0.311	0	4838.96	21	0.94	0.054	10.496	52.5	8.738	43.7
18	35	0	2	0	0	5167.1	0.368	0	5167.47	13	0	0	2.994	15	2.994	15
19	28	5	2	1	0	5382.53	0.461	0.011	5383	14	0.814	0.049	15.115	75.6	5.611	28.1
20	33	0	3	1	1	5084.86	0.178	0	5085.04	15	0.335	0.031	6.818	34.1	5.674	28.4
21	50	2	1	0	0	5125.69	0.145	0.005	5125.84	7	0.001	0	3.225	16.1	2.627	13.1
22	36	0	3	1	1	5414.9	0.639	0	5415.54	18	0.014	0.001	13.26	66.3	8.088	40.4
23	42	2	0	1	1	5423.91	0.557	0.204	5424.67	10	0.001	0	6.969	34.8	1.867	9.3
24	39	3	2	1	1	5153.8	0.048	0.004	5153.85	19	0	0	6.535	32.7	5.481	27.4
25	38	4	2	1	1	5547.97	0.575	0.113	5548.66	13	0.05	0.002	10.126	50.6	4.684	23.4
26	36	0	2	0	1	5520.76	0.586	0	5521.35	1	0.353	0.017	12.876	64.4	3.03	15.2
27	38	1	2	0	0	4946.72	0.283	0	4947	16	0	0	5.168	25.8	4.922	24.6
28	48	3	1	0	1	5388.36	0.43	0.123	5388.91	2	0.001	0	6.631	33.2	0.842	4.2

Table B-16
Alternative 16 Results

29	45	2	1	0	0	5235.63	0.03	0.026	5235.69	4	0.334	0.012	4.226	21.1	1.898	9.5
30	44	4	2	0	1	5086.72	0.067	0	5086.79	9	0.245	0.009	8.065	40.3	3.019	15.1
31	46	1	1	1	1	5303.2	0.533	0	5303.73	5	0.595	0.027	9.721	48.6	5.954	29.8
32	38	3	3	0	1	5383.67	0.579	0.012	5384.26	15	0.039	0.002	13.287	66.4	4.274	21.4
33	30	1	0	1	1	5427.18	0.439	0	5427.62	0	0.001	0	6.144	30.7	0.116	0.6
34	36	1	3	1	0	5362.62	0.473	0.004	5363.1	22	0.476	0.029	14.628	73.1	7.941	39.7
35	42	0	0	0	0	5288.42	0.003	0	5288.42	0	0.001	0	0	0	0	0
36	41	0	1	0	0	5261.17	0.004	0	5261.18	3	0.273	0.013	1.823	9.1	1.078	5.4
37	39	1	1	1	1	5676.75	0.647	0	5677.4	8	0.259	0.012	11.206	56	2.285	11.4
38	40	2	2	1	0	5353.08	0.37	0.004	5353.45	10	0.134	0.007	7.212	36.1	4.258	21.3
39	49	4	2	1	1	4982.03	0.08	0	4982.11	18	0.218	0.012	4.688	23.4	8.774	43.9
40	40	1	3	1	0	5093.06	0.162	0.008	5093.23	11	0.92	0.052	6.567	32.8	6.188	30.9
41	32	3	1	0	1	5334.98	0.319	0.03	5335.33	7	0.11	0.005	6.675	33.4	1.89	9.4
42	43	2	0	0	1	5469.59	0.475	0.046	5470.12	0	0.001	0	7.008	35	0	0
43	35	0	4	0	1	5311.86	0.675	0	5312.53	20	0.353	0.023	16.243	81.2	4.488	22.4
44	29	0	2	0	0	5054.67	0.004	0	5054.67	5	0.264	0.016	4.822	24.1	4.278	21.4
45	30	2	1	0	1	5112.14	0.374	0.015	5112.53	9	0.034	0.002	10.142	50.7	2.829	14.1
46	34	2	2	1	0	5209.16	0.317	0.313	5209.79	16	0.001	0	7.418	37.1	5.757	28.8
47	28	4	4	0	1	4832	0.202	0.004	4832.2	24	0.132	0.01	9.17	45.8	6.512	32.6
48	48	3	2	1	1	5153.56	0.06	0.061	5153.68	28	0.037	0.002	5.92	29.6	5.738	28.7
49	34	2	3	0	1	5317.43	0.134	0.012	5317.57	12	0.213	0.011	8.439	42.2	3.107	15.5
50	44	2	3	1	0	5007.9	0.049	0.004	5007.95	25	0.143	0.008	11.463	57.3	8.069	40.3
51	35	0	1	1	1	5508.35	0.53	0.184	5509.06	15	0.549	0.044	8.014	40.1	5.452	27.3
52	40	1	2	0	1	5302.31	0.203	0	5302.51	2	0.135	0.006	5.004	25	1.698	8.5
53	35	1	1	1	1	5393.61	0.591	0.004	5394.21	16	0.001	0	9.181	45.9	3.967	19.8
54	37	0	4	0	0	5102.09	0.113	0	5102.2	17	0.253	0.015	4.595	23	4.756	23.8
55	51	2	1	0	1	5469.31	0.582	0.058	5469.95	1	0.019	0.001	9.236	46.2	0.735	3.7
56	32	2	2	0	0	5158.58	0.037	0	5158.61	8	0.001	0	3.15	15.7	2.236	11.2
57	31	4	1	0	0	5263.08	0.003	0	5263.09	4	0.238	0.012	4.152	20.8	1.809	9
58	34	5	2	1	1	5027.7	0.105	0	5027.81	11	1.186	0.064	7.449	37.2	4.335	21.7
59	42	1	0	0	1	5839.84	0.882	0.03	5840.75	0	0.001	0	10.735	53.7	0.287	1.4
60	46	3	4	1	1	5483.95	0.544	0.042	5484.54	27	0.091	0.005	11.44	57.2	6.305	31.5
61	38	0	2	1	0	5576.97	0.571	0.004	5577.54	25	0.023	0.002	12.023	60.1	6.037	30.2
62	38	1	2	1	0	5280.1	0.489	0.004	5280.59	18	0.564	0.035	8.344	41.7	5.466	27.3
63	38	3	4	1	1	5176.94	0.069	0.05	5177.06	26	0.048	0.003	12.472	62.4	8.139	40.7
64	46	1	2	0	0	5061.29	0.048	0.004	5061.35	9	0.209	0.011	5.409	27	3.95	19.7
65	35	0	1	1	1	6057.84	0.795	0	6058.64	0	0.001	0	11.95	59.8	0.183	0.9
66	37	2	1	0	0	5283.76	0.077	0.074	5283.91	4	0.001	0	1.911	9.6	0.428	2.1

Table B-16
Alternative 16 Results

67	46	3	0	0	0	5275.86	0.027	0.023	5275.91	8	0.27	0.012	1.52	7.6	1.119	5.6
68	44	2	4	1	0	4908.82	0.115	0	4908.94	21	0.001	0	9.687	48.4	7.832	39.2
69	50	2	3	1	1	5303.67	0.305	0.116	5304.1	24	0.329	0.014	9.242	46.2	5.12	25.6
70	44	2	1	1	0	5412.58	0.38	0.387	5413.35	13	0.288	0.019	6.571	32.9	5.979	29.9
71	43	2	3	0	0	5075.38	0.333	0	5075.72	18	0.005	0	4.639	23.2	5.337	26.7
72	36	4	2	0	1	5283.68	0.215	0.024	5283.92	1	0.173	0.008	8.76	43.8	2.749	13.7
73	37	2	4	1	1	5548.91	0.328	0.082	5549.32	16	0.017	0.001	8.967	44.8	6.298	31.5
74	42	2	3	1	0	5731.63	0.687	0.004	5732.32	14	0.459	0.019	10.796	54	3.506	17.5
75	38	3	1	1	1	5282.32	0.046	0.02	5282.38	5	0.002	0	1.539	7.7	2.875	14.4
76	37	2	4	0	1	4835.39	0.069	0.033	4835.49	23	0.001	0	7.1	35.5	5.958	29.8
77	45	1	2	0	0	5079.44	0.004	0	5079.44	12	0.128	0.006	6.299	31.5	4.663	23.3
78	39	3	3	0	0	4692.76	0.223	0	4692.99	30	0.669	0.048	11.826	59.1	8.761	43.8
79	37	0	2	1	1	5187.97	0.479	0.004	5188.46	25	0.376	0.023	12.096	60.5	6.725	33.6
80	28	1	3	1	0	4933.8	0.081	0	4933.88	27	0	0	9.299	46.5	9.163	45.8
81	45	5	1	1	0	5124.51	0.072	0.092	5124.68	17	0.746	0.028	8.581	42.9	4.6	23
82	33	1	2	1	0	5221.06	0.058	0	5221.12	3	0.492	0.027	4.966	24.8	3.931	19.7
83	36	3	0	0	1	5340.02	0.336	0.049	5340.4	0	0.086	0.004	6.454	32.3	1.232	6.2
84	30	2	1	1	1	5564.7	0.408	0.004	5565.11	12	0.035	0.003	10.079	50.4	5.665	28.3
85	46	2	3	0	0	5160.73	0.003	0	5160.74	19	0.026	0.001	3.378	16.9	3.057	15.3
86	42	0	2	1	0	5476.58	0.311	0.11	5477	13	0.014	0.001	6.758	33.8	5.402	27
87	43	6	0	1	0	5302.77	0.226	0.147	5303.15	0	0.001	0	5.86	29.3	1.358	6.8
88	38	2	3	0	1	5180.21	0.305	0	5180.52	13	0.005	0	8.91	44.6	3.538	17.7
89	39	1	2	1	1	5413.23	0.634	0.047	5413.91	5	0.001	0	10.546	52.7	4.118	20.6
90	55	3	2	1	0	5347.56	0.36	0.095	5348.01	14	0.053	0.002	6.176	30.9	3.753	18.8
91	53	0	2	0	1	5124.65	0.032	0	5124.68	23	0.311	0.014	8.382	41.9	5.517	27.6
92	31	0	1	0	1	5668.97	0.748	0	5669.72	2	0.149	0.01	10.131	50.7	1.475	7.4
93	34	0	2	1	1	5581.23	0.244	0.004	5581.48	14	0.122	0.01	8.712	43.6	6.133	30.7
94	38	3	2	1	1	5640.24	0.288	0.004	5640.54	14	0.001	0	3.599	18	5.206	26
95	42	2	2	1	1	5073.39	0.165	0.013	5073.57	10	0.033	0.002	10.367	51.8	5.5	27.5
96	47	5	2	1	0	5264.89	0.234	0.073	5265.19	20	0.362	0.015	8.408	42	5.117	25.6
97	46	0	3	0	1	5444.24	0.497	0	5444.73	14	0.255	0.012	11.96	59.8	4.531	22.7
98	29	1	0	1	1	5920.36	0.918	0	5921.28	0	0	0	10.606	53	4.171	20.9
99	45	1	3	0	1	5142.73	0.374	0	5143.1	23	0	0	4.971	24.9	4.434	22.2
100	37	2	0	0	0	5287.36	0.043	0.043	5287.45	0	0.001	0	0.994	5	0	0

Table B-17
Alternative 17 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	22	0	0	0	0	6473.92	0.01	0	6473.97	0	0	0	0	0	0	0
Max	57	6	5	1	1	7008.19	6.22	0.694	7008.63	19	0.94	0.047	6.564	32.8	6.564	32.8
Range	35	6	5	1	1	534.277	6.21	0.694	534.656	19	0.94	0.047	6.564	32.8	6.564	32.8
Mean	39	2.17	2.04	0.51	0.37	6597.13	1.40077	0.15542	6598.69	4.37755	0.03867	0.00189	2.09216	10.4582	2.17823	10.8888
St Dev	6.35	1.48	1.23	0.5	0.49	124.64	1.46295	0.1527	125.267	5.06383	0.12415	0.0065	1.74822	8.74205	1.76124	8.80747
RUN																
1	43	2	1	1	0	6503.86	1.19	0	6505.05	0	0.001	0	0.581	2.9	0.581	2.9
2	33	0	3	1	0	6662.69	0.065	0	6662.75	10	0	0	2.76	13.8	2.76	13.8
3	28	3	2	1	0	6654.72	1.875	0.112	6656.71	0	0.079	0.005	2.474	12.4	3.333	16.7
4	36	2	2	1	0	7008.19	0.37	0.064	7008.63	10	0	0	4.16	20.8	4.16	20.8
5	48	2	1	0	1	6494.53	0.065	0	6494.6	0	0.001	0	0	0	0	0
6	44	3	3	0	0	6495.74	0.825	0.149	6496.72	4	0.022	0.001	0.897	4.5	0.897	4.5
7	37	2	3	1	0	6504.67	1.615	0.036	6506.32	0	0.001	0	1.06	5.3	1.06	5.3
8	48	4	3	0	0	6497.43	0.855	0.105	6498.39	0	0.007	0	0.857	4.3	0.857	4.3
9	29	0	2	1	0	6504.82	1.34	0.064	6506.22	0	0.001	0	1.208	6	1.208	6
10	37	3	0	1	0	6723.63	0.475	0.08	6724.18	10	0.001	0	3.08	15.4	3.08	15.4
11	42	4	4	0	1	6537.1	2.545	0.495	6540.14	2	0.001	0	2.285	11.4	1.939	9.7
12	43	0	1	0	0	6495.64	0.21	0.026	6495.88	0	0.004	0	0.143	0.7	0.143	0.7
13	33	4	1	1	0	6640.84	2.145	0.416	6643.4	10	0.002	0	5.136	25.7	5.136	25.7
14	32	1	2	1	0	6631.69	4.83	0.148	6636.67	3	0.472	0.026	3.545	17.7	3.545	17.7
15	33	1	2	0	1	6496.49	1.14	0.213	6497.84	0	0.112	0.005	0.928	4.6	0.928	4.6
16	38	2	1	1	0	6743.07	0.155	0.016	6743.24	10	0	0	4.04	20.2	4.04	20.2
17	41	0	3	1	0	6937.88	6.065	0.694	6944.64	8	0	0	3.674	18.4	4.117	20.6
18	40	3	0	0	1	6496.26	0.08	0	6496.34	0	0.001	0	0	0	0	0
19	38	4	1	0	1	6497.82	0.62	0.109	6498.55	0	0.066	0.003	0.549	2.7	0.549	2.7
20	45	0	0	1	1	6719.35	0.945	0.176	6720.47	10	0.001	0	3.36	16.8	3.36	16.8
21	34	0	5	0	0	6499.99	0.8	0.149	6500.94	2	0.001	0	0.869	4.3	0.869	4.3
22	41	2	2	1	0	6548.25	2.945	0	6551.19	0	0.001	0	1.449	7.2	1.449	7.2
23	57	4	2	0	0	6510.14	2.11	0.408	6512.66	2	0.109	0.003	2.357	11.8	2.357	11.8
24	36	5	2	1	0	6649.55	1.675	0.321	6651.55	14	0.001	0	4.746	23.7	4.746	23.7
25	33	3	2	0	0	6525.34	0.955	0.175	6526.47	3	0.004	0	1.385	6.9	1.385	6.9
26	27	3	3	1	1	6597.1	0.305	0.051	6597.45	19	0.384	0.029	3.274	16.4	3.274	16.4
27	37	4	1	0	1	6494.23	0.45	0.074	6494.75	1	0.001	0	0.788	3.9	0.788	3.9
28	38	1	0	1	0	6830.64	6.22	0	6836.86	0	0	0	3.08	15.4	3.08	15.4

Table B-17
Alternative 17 Results

29	39	3	1	1	1	6764.41	1.18	0.221	6765.81	10	0.001	0	3.996	20	3.996	20
30	36	1	4	1	1	6710.1	2.06	0.243	6712.4	12	0.001	0	4.117	20.6	4.683	23.4
31	49	1	3	1	0	6615.4	3.99	0.205	6619.6	0	0.001	0	2.093	10.5	2.093	10.5
32	38	6	0	0	0	6493.12	0.395	0.063	6493.58	0	0.004	0	0.325	1.6	0.325	1.6
33	42	3	2	1	1	6731.08	0.025	0	6731.1	10	0	0	3.2	16	3.2	16
34	37	2	2	1	1	6651.12	4.155	0.284	6655.56	8	0.031	0.002	1.661	8.3	3.123	15.6
35	50	3	1	1	0	6732.03	6.04	0	6738.07	0	0.001	0	3	15	3	15
36	45	2	0	0	0	6497.83	0.08	0	6497.91	0	0.001	0	0	0	0	0
37	46	1	3	0	1	6498.59	0.815	0.148	6499.56	4	0.001	0	0.691	3.5	0.691	3.5
38	22	1	5	1	0	6780.43	0.065	0	6780.5	10	0	0	3.12	15.6	3.12	15.6
39	34	5	0	1	0	6795.58	0.755	0.144	6796.48	10	0	0	4.413	22.1	4.413	22.1
40	42	0	3	1	0	6679.86	0.625	0.109	6680.6	10	0.001	0	4.115	20.6	4.115	20.6
41	42	2	1	0	1	6496.01	0.735	0.04	6496.78	1	0.001	0	0.464	2.3	0.224	1.1
42	47	1	2	1	0	6667.4	0.08	0	6667.48	10	0.001	0	3.532	17.7	3.532	17.7
43	39	1	4	0	0	6502.41	1.065	0.197	6503.67	0	0.036	0.001	1.347	6.7	1.347	6.7
44	31	3	3	0	1	6540.14	1.945	0.377	6542.47	0	0.052	0.002	1.977	9.9	1.977	9.9
45	40	2	1	0	0	6496.47	0.075	0	6496.55	0	0.001	0	0	0	0	0
46	40	1	1	1	1	6502.24	1.41	0.127	6503.77	0	0.083	0.004	1.027	5.1	1.027	5.1
47	38	4	1	0	1	6505.35	1.18	0.221	6506.75	0	0.001	0	0.681	3.4	0.681	3.4
48	37	0	2	0	1	6487.61	0.34	0.053	6488.01	0	0.059	0.003	0.842	4.2	0.842	4.2
49	56	1	2	0	0	6495.57	0.055	0	6495.62	0	0.001	0	0.043	0.2	0.043	0.2
50	44	1	4	1	1	6687.66	1.355	0.256	6689.27	10	0.001	0	5.173	25.9	5.053	25.3
51	39	2	3	0	1	6484.16	0.32	0.051	6484.54	4	0.063	0.003	0.306	1.5	0.306	1.5
52	39	2	2	1	1	6817.64	1.415	0.272	6819.33	10	0	0	4.674	23.4	4.674	23.4
53	42	3	4	0	0	6508.56	1.695	0.324	6510.57	1	0.007	0	1.712	8.6	1.712	8.6
54	40	2	2	0	1	6489.79	0.59	0.102	6490.48	0	0.009	0	0.885	4.4	0.885	4.4
55	39	1	2	0	0	6491.75	0.48	0.084	6492.31	3	0.003	0	0.972	4.9	0.972	4.9
56	41	3	4	0	0	6508.66	1.715	0.328	6510.7	10	0.22	0.009	2.712	13.6	2.712	13.6
57	39	1	1	1	1	6544.02	1.69	0.074	6545.79	0	0.001	0	0.337	1.7	2.391	12
58	35	1	2	0	0	6483.08	0.6	0.105	6483.79	0	0.001	0	0.259	1.3	0.259	1.3
59	42	2	2	1	0	6643.04	0.935	0.177	6644.15	12	0.02	0.001	3.9	19.5	3.9	19.5
60	29	2	2	1	0	6664.08	0.265	0.048	6664.4	10	0	0	4.064	20.3	4.064	20.3
61	47	3	0	0	1	6506.31	0.49	0	6506.8	0	0.001	0	0.24	1.2	0	0
62	28	4	2	0	0	6501.73	1	0.187	6502.92	0	0.001	0	0.54	2.7	0.54	2.7
63	44	3	0	1	0	6473.92	0.055	0	6473.97	10	0.001	0	0.88	4.4	0.88	4.4
64	39	1	2	1	0	6744.16	1.55	0.377	6746.09	10	0	0	4.68	23.4	4.68	23.4
65	45	0	1	1	0	6731.7	6.085	0	6737.79	0	0.001	0	3.04	15.2	3.04	15.2
66	48	3	2	0	0	6495.39	0.54	0.093	6496.03	0	0.001	0	0.175	0.9	0.175	0.9

Table B-17
Alternative 17 Results

67	37	1	3	0	1	6498.53	0.915	0.169	6499.61	0	0.179	0.008	1.298	6.5	1.298	6.5
68	43	1	2	1	0	6557.16	3.705	0.183	6561.05	5	0.001	0	2.172	10.9	2.172	10.9
69	36	5	4	1	0	6786.48	1.585	0.302	6788.36	12	0.007	0	5.19	25.9	5.19	25.9
70	33	4	1	0	0	6494.41	0.07	0	6494.48	0	0.001	0	0	0	0	0
71	42	1	3	1	1	6646.07	0.53	0.095	6646.7	10	0	0	3.88	19.4	3.76	18.8
72	35	5	4	1	1	6874.76	2.15	0.425	6877.34	14	0.001	0	5.708	28.5	5.708	28.5
73	33	2	2	1	0	6646.28	0.995	0	6647.27	0	0	0	1.32	6.6	2.215	11.1
74	45	2	1	1	0	6587.57	3.49	0	6591.06	0	0.001	0	1.803	9	1.803	9
75	35	3	0	0	0	6495.85	0.08	0	6495.93	0	0.001	0	0	0	0	0
76	39	3	1	0	1	6505.49	1.1	0.115	6506.7	1	0.077	0.004	1.125	5.6	1.125	5.6
77	49	3	3	0	0	6509.01	1.855	0.263	6511.13	2	0.001	0	1.634	8.2	1.634	8.2
78	37	3	4	1	0	6774.99	1	0.18	6776.17	12	0.94	0.047	6.564	32.8	6.564	32.8
79	44	2	3	1	0	6752.3	4.16	0.548	6757.01	4	0.001	0	2.387	11.9	2.927	14.6
80	45	1	2	0	0	6497.24	0.67	0.119	6498.03	0	0.001	0	0.361	1.8	0.361	1.8
81	39	3	3	0	0	6499.78	1.01	0.189	6500.98	2	0.21	0.007	1.385	6.9	1.385	6.9
82	39	0	2	1	1	6659.18	0.64	0.119	6659.94	10	0	0	3.96	19.8	3.96	19.8
83	37	0	2	0	0	6483.88	0.08	0	6483.96	0	0.001	0	0	0	0	0
84	33	1	3	0	1	6572.15	2.36	0.46	6574.97	4	0.011	0.001	1.716	8.6	1.196	6
85	39	1	1	1	1	6675.45	0.01	0	6675.46	10	0	0	2.92	14.6	2.84	14.2
86	39	1	3	0	1	6494.94	0.33	0	6495.27	0	0.001	0	0.368	1.8	0.368	1.8
87	38	2	0	1	0	6619.95	0.96	0.176	6621.08	10	0.001	0	2.684	13.4	2.684	13.4
88	34	1	3	1	0	6716.33	1.34	0.203	6717.88	14	0.01	0.001	5.487	27.4	5.487	27.4
89	39	6	3	1	0	6673.21	3.56	0.653	6677.42	13	0	0	5.988	29.9	5.988	29.9
90	38	1	1	0	0	6492.34	0.835	0.153	6493.33	0	0.001	0	0.325	1.6	0.325	1.6
91	34	1	4	0	1	6521.01	0.945	0.178	6522.13	1	0.433	0.019	1.766	8.8	1.766	8.8
92	26	2	3	0	1	6520.26	1.605	0.308	6522.18	0	0.008	0	1.245	6.2	1.166	5.8
93	42	4	1	1	0	6889.15	1.73	0.33	6891.21	10	0.001	0	4.836	24.2	4.836	24.2
94	52	5	2	1	0	6745.69	4.57	0.052	6750.31	2	0.015	0.001	0.633	3.2	3.994	20
95	43	0	3	0	0	6489.69	0.23	0.037	6489.96	0	0.001	0	0.239	1.2	0.239	1.2
96	27	1	1	0	0	6486.19	0.07	0	6486.26	0	0.001	0	0.093	0.5	0.093	0.5
97	25	3	1	1	1	6693.83	1.545	0.304	6695.68	12	0.001	0	4.568	22.8	4.568	22.8
98	47	1	2	0	0	6499.5	0.995	0.187	6500.68	4	0.001	0	0.95	4.8	0.95	4.8
99	39	4	2	1	1	6495.85	0.97	0.163	6496.99	0	0.001	0	0.51	2.5	0.51	2.5
100	32	3	3	0	0	6510.73	1.72	0.329	6512.78	4	0.003	0	1.38	6.9	1.38	6.9

Table B-18
Alternative 18 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	26	0	0	0	0	6452.67	0.335	0.054	6453.71	0	0	0	0	0	0	0
Max	57	6	6	1	1	7012.03	6.78	0.917	7015.33	19	0.964	0.05	6.843	34.2	6.843	34.2
Range	31	6	6	1	1	559.359	6.445	0.863	561.62	19	0.964	0.05	6.843	34.2	6.843	34.2
Mean	39.2	2.16	2.02	0.6	0.42	6586.6	2.42321	0.34948	6589.37	4.17347	0.05959	0.00264	2.14182	10.7051	2.27108	11.35
St Dev	6.07	1.41	1.36	0.49	0.5	135.824	1.39146	0.17617	136.326	5.07696	0.1547	0.00708	1.7343	8.67009	1.73517	8.6749
RUN																
1	43	2	1	1	0	6483.41	2.265	0.228	6485.9	0	0.001	0	0.581	2.9	0.581	2.9
2	33	0	3	1	0	6652.08	0.8	0.152	6653.04	10	0	0	2.84	14.2	2.84	14.2
3	28	3	2	1	0	6650.74	2.34	0.199	6653.28	0	0.079	0.005	2.484	12.4	3.343	16.7
4	36	2	2	1	0	6994.18	0.455	0.088	6994.73	10	0	0	4.16	20.8	4.16	20.8
5	48	2	1	0	1	6473.54	1.27	0.253	6475.06	0	0.001	0	0	0	0	0
6	44	3	3	0	0	6483.94	1.91	0.366	6486.22	4	0.029	0.001	0.897	4.5	0.897	4.5
7	37	2	3	1	0	6490.21	2.645	0.243	6493.1	0	0.001	0	1.06	5.3	1.06	5.3
8	48	4	3	0	0	6479.47	2.275	0.379	6482.13	0	0.007	0	0.852	4.3	0.852	4.3
9	29	0	2	1	0	6483.8	2.075	0.205	6486.08	0	0.001	0	1.208	6	1.208	6
10	37	3	0	1	0	6712.4	1.155	0.228	6713.79	10	0.001	0	3.04	15.2	3.04	15.2
11	42	4	4	0	1	6538.71	3.225	0.633	6542.57	2	0.003	0	1.936	9.7	1.916	9.6
12	43	0	1	0	0	6473.07	1.09	0.216	6474.37	0	0.003	0	0.143	0.7	0.143	0.7
13	33	4	1	1	0	6632.83	2.6	0.518	6635.95	10	0.001	0	5.055	25.3	5.055	25.3
14	32	1	2	1	0	6622.48	5.59	0.29	6628.36	3	0.472	0.026	3.545	17.7	3.545	17.7
15	33	1	2	0	1	6479.11	1.59	0.316	6481.02	0	0.112	0.005	0.943	4.7	0.943	4.7
16	38	2	1	1	0	6732.46	0.995	0.183	6733.64	10	0	0	4.12	20.6	4.12	20.6
17	41	0	3	1	0	6930.89	6.78	0.76	6938.43	8	0	0	3.714	18.6	3.917	19.6
18	40	3	0	0	1	6472.33	0.82	0.163	6473.31	0	0.001	0	0	0	0	0
19	38	4	1	0	1	6478.25	1.535	0.304	6480.09	0	0.103	0.004	0.549	2.7	0.549	2.7
20	45	0	0	1	1	6718.38	1.385	0.274	6720.04	10	0.001	0	3.4	17	3.4	17
21	34	0	5	0	0	6483.31	1.26	0.242	6484.81	2	0.001	0	0.89	4.4	0.89	4.4
22	41	2	2	1	0	6529.13	3.995	0.21	6533.33	0	0.001	0	1.449	7.2	1.449	7.2
23	57	4	2	0	0	6505.28	3.605	0.72	6509.61	2	0.12	0.004	2.263	11.3	2.263	11.3
24	41	4	3	1	0	6656.29	3.635	0.523	6660.45	12	0.001	0	5.43	27.2	5.43	27.2
25	41	6	2	1	0	7012.03	2.755	0.548	7015.33	13	0.211	0.012	6.843	34.2	6.843	34.2
26	30	3	0	0	0	6470.61	1.115	0.207	6471.93	0	0	0	0	0	0	0
27	38	2	2	1	0	6484.37	2.2	0.375	6486.95	0	0.001	0	0.863	4.3	0.863	4.3
28	38	1	0	1	0	6833.37	2.855	0.569	6836.8	10	0.001	0	4.96	24.8	4.96	24.8

Table B-18
Alternative 18 Results

29	33	1	0	1	1	6470.08	1.32	0.167	6471.56	0	0.001	0	0.274	1.4	0.274	1.4
30	34	1	3	0	1	6509.1	2.56	0.509	6512.17	5	0.013	0.001	1.768	8.8	1.768	8.8
31	35	2	2	1	1	6501.32	2.765	0.173	6504.26	0	0.001	0	0.037	0.2	1.195	6
32	41	3	0	0	1	6470.46	1.24	0.246	6471.94	0	0.001	0	0	0	0	0
33	40	4	6	0	1	6532.39	3.625	0.67	6536.68	9	0.083	0.003	3.34	16.7	3.34	16.7
34	36	2	3	0	1	6556.23	3.835	0.751	6560.82	1	0.301	0.012	2.848	14.2	2.488	12.4
35	27	3	4	0	0	6483.21	1.7	0.338	6485.25	0	0.218	0.01	1.235	6.2	1.235	6.2
36	41	4	2	1	1	6518.04	4.85	0.553	6523.45	0	0.001	0	2.249	11.2	2.249	11.2
37	38	3	2	1	1	6561.12	1.32	0.254	6562.7	10	0.001	0	2.441	12.2	2.441	12.2
38	35	4	2	1	1	6774.58	6.205	0.567	6781.35	1	0.153	0.006	3.865	19.3	3.865	19.3
39	44	2	1	1	0	6829.19	3.215	0.665	6833.07	10	0	0	5.029	25.1	5.029	25.1
40	35	0	3	0	1	6482.22	1.705	0.34	6484.27	0	0.001	0	0.81	4	0.803	4
41	45	2	1	1	1	6600.25	2.505	0.404	6603.16	10	0.001	0	2.422	12.1	2.422	12.1
42	35	2	3	1	0	6578.03	2.53	0.505	6581.07	19	0.332	0.015	3.707	18.5	3.707	18.5
43	43	0	3	1	0	6551.42	2.12	0.313	6553.86	14	0.001	0	2.395	12	2.395	12
44	26	3	3	1	1	6574.07	2.8	0.444	6577.32	0	0.001	0	0.854	4.3	3.326	16.6
45	37	3	2	1	0	6568.93	4.625	0.331	6573.89	2	0.001	0	2.195	11	2.195	11
46	38	3	1	0	0	6475.03	0.86	0.156	6476.05	0	0.001	0	0	0	0	0
47	34	2	3	1	1	6897.53	4.69	0.917	6903.13	4	0.344	0.017	5.277	26.4	5.277	26.4
48	50	0	0	1	0	6646.83	1.245	0.174	6648.24	0	0.001	0	0	0	3.566	17.8
49	45	2	2	1	0	6637.04	1.125	0.22	6638.39	10	0	0	3.88	19.4	3.88	19.4
50	32	2	1	1	1	6573.11	3.185	0.251	6576.55	0	0.008	0	1.38	6.9	1.425	7.1
51	43	1	5	1	1	6715.99	4.21	0.241	6720.44	9	0.114	0.004	3.235	16.2	3.235	16.2
52	46	1	0	0	1	6469.44	0.73	0.144	6470.32	0	0.001	0	0	0	0	0
53	42	3	4	0	0	6503.54	2.765	0.551	6506.86	1	0.001	0	1.606	8	1.606	8
54	40	2	2	0	1	6475.11	1.425	0.283	6476.82	0	0.033	0.001	0.919	4.6	0.919	4.6
55	39	1	2	0	0	6473.82	1.545	0.309	6475.67	3	0.002	0	0.938	4.7	0.938	4.7
56	41	3	4	0	0	6507.72	2.64	0.519	6510.88	10	0.146	0.006	2.586	12.9	2.586	12.9
57	39	1	1	1	1	6522.83	2.66	0.275	6525.77	0	0.008	0	0.339	1.7	2.392	12
58	35	1	2	0	0	6480.14	1.245	0.234	6481.62	0	0.001	0	0.259	1.3	0.259	1.3
59	42	2	2	1	0	6630.06	1.455	0.211	6631.72	12	0.011	0.001	3.922	19.6	3.922	19.6
60	29	2	2	1	0	6651.02	0.785	0.154	6651.95	10	0	0	4.024	20.1	4.024	20.1
61	47	3	0	0	1	6484.86	1.37	0.184	6486.41	0	0.001	0	0.24	1.2	0	0
62	28	4	2	0	0	6491.65	1.815	0.347	6493.81	0	0.001	0	0.54	2.7	0.54	2.7
63	43	3	0	1	0	6452.67	0.87	0.172	6453.71	10	0.001	0	0.84	4.2	0.84	4.2
64	35	1	2	0	1	6474.86	0.775	0.136	6475.77	0	0.001	0	0.05	0.2	0.05	0.2
65	47	1	2	0	0	6478.36	1.71	0.326	6480.39	0	0.001	0	0	0	0	0
66	41	2	2	1	1	6591.25	4.895	0.44	6596.59	0	0.018	0.001	2.865	14.3	2.865	14.3

Table B-18
Alternative 18 Results

67	35	0	1	1	0	6888.13	2.23	0.443	6890.8	10	0	0	5	25	5	25
68	45	6	4	1	0	6516	4.4	0.527	6520.92	0	0.001	0	2.215	11.1	2.215	11.1
69	40	2	1	0	1	6473.76	1.23	0.234	6475.22	0	0.001	0	0	0	0	0
70	49	1	2	0	1	6478.43	1.475	0.293	6480.2	0	0.001	0	0.232	1.2	0.232	1.2
71	47	1	2	0	0	6479.49	0.97	0.18	6480.64	0	0.001	0	0	0	0	0
72	36	2	0	0	1	6472.67	0.86	0.169	6473.7	0	0.001	0	0	0	0	0
73	45	2	2	1	1	6623.73	1.885	0.376	6625.99	11	0	0	4.568	22.8	4.568	22.8
74	43	1	0	1	1	6903.53	2.475	0.486	6906.5	10	0	0	4.68	23.4	4.68	23.4
75	39	1	2	1	0	6872.12	1.3	0.258	6873.68	11	0.249	0.018	5.104	25.5	5.104	25.5
76	48	4	3	1	0	6592.19	5.52	0.432	6598.14	1	0.883	0.027	4.49	22.5	4.49	22.5
77	41	3	0	1	0	6602.71	3.34	0.227	6606.28	0	0.001	0	1.08	5.4	1.08	5.4
78	40	3	3	0	1	6503.72	2.96	0.589	6507.27	7	0.262	0.009	2.382	11.9	2.382	11.9
79	30	0	3	1	1	6861.64	4.19	0.654	6866.48	4	0	0	3.574	17.9	5.192	26
80	44	5	6	1	0	6672.78	2.725	0.543	6676.05	15	0.125	0.005	5.723	28.6	5.723	28.6
81	41	4	3	1	0	6615.47	3.44	0.593	6619.5	4	0.17	0.008	3.045	15.2	4.486	22.4
82	32	1	3	0	0	6477.41	1.22	0.236	6478.87	0	0.001	0	0.43	2.2	0.43	2.2
83	46	3	2	1	0	6585.1	1.22	0.241	6586.56	10	0.001	0	2.542	12.7	2.542	12.7
84	32	1	3	1	1	6670.44	1.7	0.154	6672.3	10	0	0	3.424	17.1	3.424	17.1
85	48	1	0	1	0	6782.78	1.285	0.256	6784.32	10	0.001	0	4.04	20.2	4.04	20.2
86	37	2	3	1	0	6702.94	3.78	0.336	6707.05	0	0	0	1.731	8.7	2.021	10.1
87	31	2	2	1	1	6554.24	4.645	0.238	6559.13	0	0.001	0	1.779	8.9	1.779	8.9
88	50	3	1	0	1	6477.77	1.455	0.287	6479.51	2	0.001	0	0.656	3.3	0.656	3.3
89	27	3	4	0	1	6667.97	2.885	0.576	6671.43	14	0.964	0.05	3.87	19.3	3.11	15.5
90	40	1	2	1	1	6532.69	4.24	0.333	6537.26	4	0.006	0	1.946	9.7	1.946	9.7
91	50	1	1	1	0	6500.06	0.71	0.14	6500.91	10	0.001	0	2.425	12.1	2.425	12.1
92	47	3	3	1	1	6515.99	2.675	0.242	6518.9	0	0.103	0.003	2.298	11.5	2.298	11.5
93	37	2	2	1	0	6488.1	2.435	0.225	6490.76	0	0.001	0	1.069	5.3	1.069	5.3
94	44	2	2	0	0	6491.84	2.015	0.402	6494.26	0	0.001	0	0.544	2.7	0.544	2.7
95	37	3	4	1	0	6585.9	3.085	0.614	6589.6	10	0.062	0.003	3.836	19.2	3.836	19.2
96	39	0	1	0	0	6467.53	0.335	0.054	6467.92	0	0.001	0	0	0	0	0
97	31	4	3	0	1	6484.12	2.025	0.353	6486.5	0	0.001	0	1.155	5.8	1.155	5.8
98	37	0	0	1	0	6728.06	4.645	0.507	6733.21	0	0	0	2.28	11.4	2.63	13.1
99	35	5	2	1	0	6663.58	1.955	0.388	6665.93	10	0.044	0.002	3.866	19.3	3.866	19.3
100	42	1	2	1	0	6539.3	4.09	0.177	6543.57	0	0.001	0	1.741	8.7	1.741	8.7

Table B-19
Alternative 19 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	28	0	0	0	0	5397.08	0	0	5397.59	0	0	0	0	0	0	0
Max	56	6	6	1	1	6565.76	0.803	0.24	6565.76	23	1.224	0.083	12.309	61.5	6.593	33
Range	28	6	6	1	1	1168.68	0.803	0.24	1168.17	23	1.224	0.083	12.309	61.5	6.593	33
Mean	39.3	1.94	2	0.54	0.47	6298.6	0.11524	0.02296	6298.73	7.70408	0.09497	0.00479	3.11064	15.552	2.74073	13.702
St Dev	5.75	1.36	1.3	0.5	0.5	218.831	0.15667	0.0519	218.796	6.45219	0.2069	0.01158	2.37724	11.8847	1.85527	9.27589
RUN																
1	43	2	1	1	0	6466.15	0.046	0	6466.2	0	0.001	0	0.581	2.9	0.581	2.9
2	33	0	3	1	0	6412.67	0.003	0	6412.67	10	0	0	3.396	17	3.396	17
3	34	2	3	0	0	6370.16	0.144	0	6370.3	4	0.001	0	0.612	3.1	0.612	3.1
4	48	2	5	0	1	6046.07	0.097	0.016	6046.18	14	0.132	0.005	4.222	21.1	2.766	13.8
5	43	1	3	0	1	5977.48	0.026	0	5977.51	2	0.131	0.005	3.419	17.1	2.785	13.9
6	46	2	6	0	1	5934.94	0.698	0.042	5935.68	23	0.069	0.002	7.102	35.5	5.762	28.8
7	50	2	1	0	0	6443.22	0.15	0	6443.37	0	0.001	0	0.173	0.9	0.173	0.9
8	36	1	1	1	0	6482.54	0.165	0	6482.7	0	0	0	2.044	10.2	2.044	10.2
9	36	1	2	1	1	6498.7	0.173	0.24	6499.11	14	0.134	0.009	7.235	36.2	5.981	29.9
10	42	2	0	1	0	6500.21	0.192	0.192	6500.59	10	0.001	0	3.301	16.5	2.499	12.5
11	37	2	1	0	1	6361.32	0.471	0.043	6361.83	8	0	0	3.139	15.7	2.883	14.4
12	35	1	3	1	0	6288.02	0	0	6288.02	10	0.128	0.007	4.195	21	4.195	21
13	42	3	3	1	0	6228.38	0.003	0	6228.39	13	0.017	0.001	4.646	23.2	4.646	23.2
14	30	2	2	1	0	6152.12	0.126	0	6152.25	15	0.068	0.003	3.705	18.5	3.705	18.5
15	36	3	0	1	1	6497.06	0.177	0.176	6497.42	10	0.001	0	2.223	11.1	2.223	11.1
16	37	3	3	0	1	6089.07	0.277	0.052	6089.4	5	0.001	0	2.035	10.2	1.672	8.4
17	34	0	6	0	1	5397.08	0.512	0	5397.59	21	0.307	0.017	9.255	46.3	5.224	26.1
18	36	0	0	0	1	6466.28	0.003	0	6466.28	0	0.001	0	0	0	0	0
19	41	2	3	0	1	6050.47	0.055	0	6050.53	3	0.43	0.017	4.466	22.3	2.646	13.2
20	36	3	2	1	1	6223.18	0.003	0	6223.18	15	0.027	0.001	3.506	17.5	3.506	17.5
21	41	1	2	0	1	6418.46	0.015	0	6418.47	0	0.001	0	0.167	0.8	0.167	0.8
22	47	3	2	1	0	6329.05	0.037	0	6329.08	0	0.001	0	1.797	9	1.797	9
23	39	1	3	1	1	6276.65	0.069	0.155	6276.87	16	0.001	0	8.361	41.8	4.161	20.8
24	45	0	1	1	0	6399.22	0.09	0	6399.31	12	0.078	0.003	2.795	14	2.795	14
25	32	1	4	1	0	6033.55	0.031	0	6033.58	6	0.122	0.005	2.351	11.8	2.351	11.8
26	33	2	0	0	1	6465.61	0.003	0	6465.61	0	0.001	0	0	0	0	0
27	33	1	2	1	1	6565.76	0.002	0	6565.76	12	0	0	5.877	29.4	5.877	29.4
28	37	3	3	1	0	6124.82	0.084	0	6124.9	12	0.41	0.021	3.396	17	3.396	17

Table B-19
Alternative 19 Results

29	41	5	3	0	0	5818.96	0.418	0	5819.38	16	0.997	0.044	4.646	23.2	4.646	23.2
30	28	3	2	1	1	6086.4	0.003	0	6086.41	17	0.028	0.002	6.358	31.8	6.358	31.8
31	43	2	2	0	1	6381.27	0.089	0	6381.36	0	0.008	0	0.557	2.8	0.557	2.8
32	34	2	4	0	1	5900.34	0.093	0	5900.44	13	0.2	0.01	7.854	39.3	4.12	20.6
33	39	4	1	1	1	6468.14	0.023	0	6468.17	14	0.266	0.012	3.538	17.7	3.538	17.7
34	34	2	2	0	1	6000.73	0.003	0	6000.74	10	0.996	0.05	7.667	38.3	4.018	20.1
35	34	1	2	1	0	6384.1	0.138	0.128	6384.37	15	0.012	0.001	4.16	20.8	4.16	20.8
36	49	5	2	0	0	6376.67	0.036	0	6376.71	4	0.001	0	0.634	3.2	0.634	3.2
37	44	0	1	1	1	6381.83	0.003	0	6381.84	10	0.005	0	2.441	12.2	2.441	12.2
38	41	2	2	0	1	6402.01	0.146	0	6402.15	2	0.001	0	1.489	7.4	0.689	3.4
39	42	3	1	0	0	6394.54	0.002	0	6394.54	0	0.002	0	0.362	1.8	0.362	1.8
40	42	1	3	0	1	6315.8	0.077	0	6315.88	5	0.165	0.006	1.665	8.3	1.418	7.1
41	48	2	1	1	0	6383.43	0.004	0	6383.43	0	0.001	0	1.783	8.9	2.062	10.3
42	48	0	2	0	0	6356.16	0.003	0	6356.16	4	0.001	0	0.707	3.5	0.707	3.5
43	34	3	2	1	1	6420.48	0.056	0	6420.53	1	0.036	0.001	2.516	12.6	2.298	11.5
44	33	1	0	0	1	6468.29	0	0	6468.29	0	0.001	0	0.08	0.4	0	0
45	28	2	0	0	0	6459	0.003	0	6459	0	0	0	0.062	0.3	0.062	0.3
46	33	0	2	0	1	6367.76	0.003	0	6367.77	1	0.001	0	0.415	2.1	0.415	2.1
47	43	1	3	1	0	6116.22	0.658	0	6116.88	16	0.17	0.008	3.171	15.9	5.148	25.7
48	32	3	0	1	0	6523.49	0.076	0	6523.56	10	0	0	4.121	20.6	4.121	20.6
49	39	3	2	1	0	6396.95	0.235	0	6397.18	12	0.001	0	5.091	25.5	5.663	28.3
50	45	0	1	1	0	6465.44	0.002	0	6465.45	10	0.001	0	3.716	18.6	3.716	18.6
51	37	2	3	1	0	6223.55	0.125	0	6223.67	10	0.001	0	3.626	18.1	3.626	18.1
52	51	2	1	0	0	6389.46	0.001	0	6389.47	0	0.064	0.002	0.466	2.3	0.466	2.3
53	43	1	3	1	0	6406.06	0.225	0	6406.28	12	0.172	0.008	5.44	27.2	5.44	27.2
54	35	0	1	1	1	6487.08	0.133	0.016	6487.23	0	0	0	1.771	8.9	1.451	7.3
55	44	0	1	1	0	6383.44	0.002	0	6383.44	10	0	0	3.134	15.7	3.134	15.7
56	44	1	4	0	0	5630.03	0.003	0	5630.03	20	0.062	0.003	4.167	20.8	4.167	20.8
57	43	2	1	0	0	6443.42	0.003	0	6443.42	0	0.001	0	0.148	0.7	0.148	0.7
58	30	4	2	0	1	6011.21	0.038	0	6011.24	17	1.224	0.083	3.302	16.5	3.302	16.5
59	41	1	1	1	1	6429.62	0.067	0.064	6429.75	11	0.332	0.02	4.672	23.4	4.672	23.4
60	42	1	0	0	1	6487.94	0.099	0.096	6488.14	0	0.001	0	1.912	9.6	0	0
61	48	3	4	1	1	6287.16	0.003	0	6287.16	17	0.001	0	5.606	28	5.606	28
62	50	0	2	1	0	6250.82	0.099	0	6250.92	0	0.09	0.003	1.854	9.3	1.854	9.3
63	36	4	2	1	0	6327.54	0.173	0.16	6327.88	10	0.05	0.003	5.196	26	5.196	26
64	44	1	1	0	1	6422.93	0.003	0	6422.93	1	0.001	0	0.455	2.3	0.455	2.3
65	28	2	2	1	0	6360.45	0.213	0	6360.67	10	0	0	2.738	13.7	2.738	13.7
66	37	0	4	1	0	6409.45	0.083	0.08	6409.62	12	0.001	0	4.163	20.8	4.163	20.8

Table B-19
Alternative 19 Results

67	42	2	3	1	1	6481.81	0.28	0.042	6482.14	18	0.307	0.021	6.927	34.6	6.593	33
68	37	1	3	0	1	5865.28	0.088	0	5865.37	8	0.001	0	8.441	42.2	3.514	17.6
69	39	1	1	1	0	6257.21	0.003	0	6257.22	10	0.058	0.003	3.465	17.3	3.465	17.3
70	36	0	2	0	0	6220.04	0.003	0	6220.05	4	0.074	0.004	1.448	7.2	1.448	7.2
71	42	3	2	0	0	6288	0.049	0	6288.05	4	0.002	0	1.23	6.1	1.23	6.1
72	33	2	2	1	0	6423.62	0.024	0.016	6423.66	10	0.01	0.001	2.798	14	2.798	14
73	43	2	3	0	0	6291.12	0.267	0	6291.38	4	0.016	0.001	1.612	8.1	1.612	8.1
74	36	4	2	0	1	6401.05	0.034	0.016	6401.1	0	0.001	0	0.795	4	0.795	4
75	31	1	3	1	1	6458.82	0.121	0	6458.94	12	0.003	0	4.269	21.3	4.269	21.3
76	41	4	1	0	1	6425.76	0.052	0.049	6425.86	0	0.001	0	0.687	3.4	0	0
77	40	2	5	0	0	5886.39	0.803	0	5887.2	16	0.226	0.011	4.495	22.5	4.495	22.5
78	42	3	1	1	0	6435.89	0.034	0	6435.93	0	0.031	0.001	1.399	7	1.399	7
79	43	0	4	0	0	6321.57	0.332	0	6321.9	5	0.22	0.009	2.092	10.5	2.092	10.5
80	34	4	2	1	1	6219.01	0.181	0.128	6219.32	12	0.28	0.014	3.886	19.4	3.886	19.4
81	35	2	2	0	0	6413.76	0.131	0.043	6413.93	2	0.001	0	1.048	5.2	1.048	5.2
82	34	4	2	1	0	6164.53	0.011	0	6164.54	13	0.009	0	5.305	26.5	5.305	26.5
83	45	5	1	1	0	6366.51	0.015	0.016	6366.54	10	0.001	0	2.629	13.1	2.629	13.1
84	33	1	2	1	0	6386.38	0.047	0	6386.42	0	0.001	0	0.653	3.3	0.653	3.3
85	36	3	0	0	1	6447.39	0.009	0	6447.4	0	0.001	0	0.08	0.4	0	0
86	30	2	1	1	1	6504.51	0.108	0	6504.62	10	0	0	4.837	24.2	4.837	24.2
87	46	2	3	0	0	6306.14	0.003	0	6306.14	8	0.089	0.003	2.012	10.1	2.012	10.1
88	42	0	2	1	0	6530.5	0.087	0.208	6530.8	11	0	0	5.182	25.9	5.182	25.9
89	43	6	0	1	0	6464.59	0.066	0	6464.66	0	0.001	0	0.827	4.1	0.827	4.1
90	38	2	3	0	1	6189.91	0.04	0	6189.95	0	0.087	0.004	1.315	6.6	1.315	6.6
91	39	1	2	1	1	6167.59	0.12	0	6167.71	3	0.46	0.021	3.22	16.1	3.22	16.1
92	56	3	2	1	0	6474.49	0.281	0	6474.77	14	0.001	0	4.186	20.9	4.186	20.9
93	44	1	1	1	1	6493.54	0.122	0.144	6493.81	10	0.001	0	2.136	10.7	2.136	10.7
94	37	1	3	0	0	6328.72	0.27	0	6328.99	1	0.006	0	1.126	5.6	1.126	5.6
95	40	2	2	1	1	5562.91	0.067	0	5562.98	20	0.347	0.019	12.309	61.5	6.393	32
96	45	2	0	1	1	6472.97	0.1	0	6473.07	0	0.001	0	1.264	6.3	1.264	6.3
97	38	1	1	0	1	6380.9	0.499	0.048	6381.45	7	0	0	2.955	14.8	2.936	14.7
98	47	5	2	1	0	6301.58	0.034	0.032	6301.65	16	0.114	0.005	4.246	21.2	4.246	21.2
99	33	2	2	1	0	6425.77	0.061	0.048	6425.88	12	0	0	4.021	20.1	4.021	20.1
100	38	3	0	0	0	6466.57	0.008	0	6466.58	0	0.001	0	0.243	1.2	0.243	1.2

Table B-20
Alternative 20 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	28	0	0	0	0	5397.08	0	0	5397.59	0	0	0	0	0	0	0
Max	56	6	6	1	1	6565.06	0.803	0.208	6565.1	23	1.224	0.083	12.309	61.5	6.453	32.3
Range	28	6	6	1	1	1167.98	0.803	0.208	1167.51	23	1.224	0.083	12.309	61.5	6.453	32.3
Mean	39.3	1.94	2	0.54	0.47	6299.86	0.11539	0.02314	6300	7.62245	0.09613	0.00481	3.06879	15.3439	2.72946	13.648
St Dev	5.75	1.36	1.3	0.5	0.5	220.141	0.15436	0.04679	220.111	6.41756	0.20884	0.01158	2.36661	11.8332	1.83908	9.1981
RUN																
1	43	2	1	1	0	6466.15	0.046	0	6466.2	0	0.001	0	0.581	2.9	0.581	2.9
2	33	0	3	1	0	6412.67	0.003	0	6412.67	10	0	0	3.396	17	3.396	17
3	34	2	3	0	0	6369.75	0.145	0.003	6369.9	4	0.001	0	0.612	3.1	0.612	3.1
4	48	2	5	0	1	6043.53	0.091	0.026	6043.65	14	0.139	0.005	4.302	21.5	2.813	14.1
5	43	1	3	0	1	5965.69	0.024	0.01	5965.72	3	0.137	0.005	3.249	16.2	2.535	12.7
6	46	2	6	0	1	5950.82	0.683	0.059	5951.56	23	0.046	0.002	6.897	34.5	5.638	28.2
7	50	2	1	0	0	6441.91	0.146	0.008	6442.06	0	0.001	0	0.173	0.9	0.173	0.9
8	36	1	1	1	0	6482.54	0.165	0	6482.7	0	0	0	2.044	10.2	2.044	10.2
9	36	1	2	1	1	6558.57	0.161	0.16	6558.89	11	0.06	0.004	6.141	30.7	5.401	27
10	42	2	0	1	0	6523.51	0.209	0.208	6523.92	10	0.001	0	3.09	15.5	2.499	12.5
11	37	2	1	0	1	6367.72	0.477	0.044	6368.24	8	0	0	3.031	15.2	2.856	14.3
12	35	1	3	1	0	6288.02	0	0	6288.02	10	0.128	0.007	4.195	21	4.195	21
13	42	3	3	1	0	6228.38	0.003	0	6228.39	13	0.017	0.001	4.646	23.2	4.646	23.2
14	30	2	2	1	0	6152.12	0.126	0	6152.25	15	0.068	0.003	3.705	18.5	3.705	18.5
15	36	3	0	1	1	6514.79	0.184	0.183	6515.15	10	0.001	0	2.223	11.1	2.223	11.1
16	37	3	3	0	1	6097.29	0.259	0.052	6097.61	5	0.001	0	1.908	9.5	1.545	7.7
17	34	0	6	0	1	5397.08	0.512	0	5397.59	21	0.307	0.017	9.255	46.3	5.224	26.1
18	36	0	0	0	1	6466.28	0.003	0	6466.28	0	0.001	0	0	0	0	0
19	41	2	3	0	1	6050.47	0.055	0	6050.53	3	0.43	0.017	4.466	22.3	2.646	13.2
20	36	3	2	1	1	6223.18	0.003	0	6223.18	15	0.027	0.001	3.506	17.5	3.506	17.5
21	41	1	2	0	1	6418.46	0.015	0	6418.47	0	0.001	0	0.167	0.8	0.167	0.8
22	47	3	2	1	0	6325.71	0.027	0.018	6325.76	0	0.001	0	1.797	9	1.797	9
23	39	1	3	1	1	6289.77	0.052	0.145	6289.96	16	0.001	0	8.389	41.9	4.253	21.3
24	45	0	1	1	0	6399.22	0.09	0	6399.31	12	0.078	0.003	2.795	14	2.795	14
25	32	1	4	1	0	6033.55	0.031	0	6033.58	6	0.122	0.005	2.351	11.8	2.351	11.8
26	33	2	0	0	1	6465.61	0.003	0	6465.61	0	0.001	0	0	0	0	0
27	33	1	2	1	1	6565.06	0.018	0.016	6565.1	12	0	0	5.877	29.4	5.877	29.4
28	37	3	3	1	0	6124.82	0.084	0	6124.9	12	0.41	0.021	3.396	17	3.396	17

Table B-20
Alternative 20 Results

29	41	5	3	0	0	5818.96	0.418	0	5819.38	16	0.997	0.044	4.646	23.2	4.646	23.2
30	28	3	2	1	1	6086.4	0.003	0	6086.41	17	0.028	0.002	6.358	31.8	6.358	31.8
31	43	2	2	0	1	6381.27	0.089	0	6381.36	0	0.008	0	0.557	2.8	0.557	2.8
32	34	2	4	0	1	5900.34	0.093	0	5900.44	13	0.2	0.01	7.854	39.3	4.12	20.6
33	39	4	1	1	1	6468.14	0.023	0	6468.17	14	0.266	0.012	3.538	17.7	3.538	17.7
34	34	2	2	0	1	6000.73	0.003	0	6000.74	10	0.996	0.05	7.667	38.3	4.018	20.1
35	34	1	2	1	0	6390.77	0.138	0.134	6391.05	15	0.012	0.001	4.16	20.8	4.16	20.8
36	49	5	2	0	0	6376.67	0.036	0	6376.71	4	0.001	0	0.634	3.2	0.634	3.2
37	44	0	1	1	1	6381.83	0.003	0	6381.84	10	0.005	0	2.441	12.2	2.441	12.2
38	41	2	2	0	1	6400.25	0.136	0.01	6400.4	2	0.001	0	1.489	7.4	0.689	3.4
39	42	3	1	0	0	6390.02	0.009	0.006	6390.04	0	0.005	0	0.442	2.2	0.442	2.2
40	42	1	3	0	1	6315.8	0.077	0	6315.88	5	0.165	0.006	1.665	8.3	1.418	7.1
41	48	2	1	1	0	6383.43	0.004	0	6383.43	0	0.001	0	1.783	8.9	2.062	10.3
42	48	0	2	0	0	6356.16	0.003	0	6356.16	4	0.001	0	0.707	3.5	0.707	3.5
43	34	3	2	1	1	6416.73	0.057	0.007	6416.79	1	0.045	0.002	2.636	13.2	2.347	11.7
44	33	1	0	0	1	6466.01	0.007	0.006	6466.02	0	0.001	0	0.08	0.4	0	0
45	28	2	0	0	0	6459	0.003	0	6459	0	0	0	0.062	0.3	0.062	0.3
46	33	0	2	0	1	6367.76	0.003	0	6367.77	1	0.001	0	0.415	2.1	0.415	2.1
47	43	1	3	1	0	6116.22	0.658	0	6116.88	16	0.17	0.008	3.171	15.9	5.148	25.7
48	32	3	0	1	0	6523.49	0.076	0	6523.56	10	0	0	4.121	20.6	4.121	20.6
49	39	3	2	1	0	6396.95	0.235	0	6397.18	12	0.001	0	5.091	25.5	5.663	28.3
50	45	0	1	1	0	6459.01	0.026	0.025	6459.06	10	0.008	0	3.72	18.6	3.72	18.6
51	37	2	3	1	0	6223.55	0.125	0	6223.67	10	0.001	0	3.626	18.1	3.626	18.1
52	51	2	1	0	0	6389.46	0.001	0	6389.47	0	0.064	0.002	0.466	2.3	0.466	2.3
53	43	1	3	1	0	6406.06	0.225	0	6406.28	12	0.172	0.008	5.44	27.2	5.44	27.2
54	35	0	1	1	1	6484.38	0.14	0.023	6484.54	0	0	0	1.771	8.9	1.451	7.3
55	44	0	1	1	0	6383.44	0.002	0	6383.44	10	0	0	3.134	15.7	3.134	15.7
56	44	1	4	0	0	5630.03	0.003	0	5630.03	20	0.062	0.003	4.167	20.8	4.167	20.8
57	43	2	1	0	0	6443.42	0.003	0	6443.42	0	0.001	0	0.148	0.7	0.148	0.7
58	30	4	2	0	1	6010.85	0.03	0.015	6010.89	17	1.224	0.083	3.302	16.5	3.302	16.5
59	41	1	1	1	1	6432.18	0.067	0.064	6432.31	11	0.332	0.02	4.672	23.4	4.672	23.4
60	42	1	0	0	1	6484.19	0.112	0.109	6484.41	0	0.001	0	1.912	9.6	0	0
61	48	3	4	1	1	6287.16	0.003	0	6287.16	17	0.001	0	5.606	28	5.606	28
62	50	0	2	1	0	6250.82	0.099	0	6250.92	0	0.09	0.003	1.854	9.3	1.854	9.3
63	36	4	2	1	0	6331.37	0.173	0.032	6331.57	10	0.05	0.003	5.196	26	5.196	26
64	44	1	1	0	1	6422.93	0.003	0	6422.93	1	0.001	0	0.455	2.3	0.455	2.3
65	28	2	2	1	0	6360.45	0.213	0	6360.67	10	0	0	2.738	13.7	2.738	13.7
66	37	0	4	1	0	6413.23	0.088	0.085	6413.4	12	0.001	0	4.163	20.8	4.163	20.8

Table B-20
Alternative 20 Results

67	42	2	3	1	1	6485.72	0.241	0.058	6486.02	17	0.261	0.018	6.833	34.2	6.453	32.3
68	37	1	3	0	1	5865.28	0.088	0	5865.37	8	0.001	0	8.441	42.2	3.514	17.6
69	39	1	1	1	0	6235.23	0.014	0.011	6235.25	10	0.071	0.003	3.476	17.4	3.476	17.4
70	36	0	2	0	0	6220.04	0.003	0	6220.05	4	0.074	0.004	1.448	7.2	1.448	7.2
71	42	3	2	0	0	6288	0.049	0	6288.05	4	0.002	0	1.23	6.1	1.23	6.1
72	33	2	2	1	0	6423.46	0.024	0.022	6423.5	10	0.01	0.001	2.798	14	2.798	14
73	43	2	3	0	0	6291.12	0.267	0	6291.38	4	0.016	0.001	1.612	8.1	1.612	8.1
74	36	4	2	0	1	6400.95	0.034	0.013	6401	0	0.001	0	0.795	4	0.795	4
75	31	1	3	1	1	6458.82	0.121	0	6458.94	12	0.003	0	4.269	21.3	4.269	21.3
76	41	4	1	0	1	6427.05	0.053	0.05	6427.15	0	0.001	0	0.687	3.4	0	0
77	40	2	5	0	0	5886.39	0.803	0	5887.2	16	0.226	0.011	4.495	22.5	4.495	22.5
78	42	3	1	1	0	6435.89	0.034	0	6435.93	0	0.031	0.001	1.399	7	1.399	7
79	43	0	4	0	0	6309.16	0.317	0.026	6309.51	5	0.43	0.017	2.099	10.5	2.099	10.5
80	34	4	2	1	1	6221.77	0.181	0.026	6221.98	12	0.28	0.014	3.886	19.4	3.886	19.4
81	35	2	2	0	0	6416.24	0.114	0.044	6416.4	2	0.001	0	1.048	5.2	1.048	5.2
82	34	4	2	1	0	6159.86	0.008	0.003	6159.87	13	0.011	0.001	5.331	26.7	5.331	26.7
83	45	5	1	1	0	6366.93	0.037	0.038	6367	10	0.001	0	2.629	13.1	2.629	13.1
84	33	1	2	1	0	6386.38	0.047	0	6386.42	0	0.001	0	0.653	3.3	0.653	3.3
85	36	3	0	0	1	6446	0.009	0.006	6446.01	0	0.001	0	0.08	0.4	0	0
86	30	2	1	1	1	6503.08	0.105	0.003	6503.18	10	0	0	4.837	24.2	4.837	24.2
87	46	2	3	0	0	6306.14	0.003	0	6306.14	8	0.089	0.003	2.012	10.1	2.012	10.1
88	42	0	2	1	0	6555.23	0.148	0.205	6555.59	10	0	0	4.99	25	4.99	25
89	43	6	0	1	0	6464.59	0.066	0	6464.66	0	0.001	0	0.827	4.1	0.827	4.1
90	38	2	3	0	1	6189.91	0.04	0	6189.95	0	0.087	0.004	1.315	6.6	1.315	6.6
91	39	1	2	1	1	6167.59	0.12	0	6167.71	3	0.46	0.021	3.22	16.1	3.22	16.1
92	56	3	2	1	0	6474.49	0.281	0	6474.77	14	0.001	0	4.186	20.9	4.186	20.9
93	44	1	1	1	1	6502.11	0.133	0.155	6502.4	10	0.001	0	2.136	10.7	2.136	10.7
94	37	1	3	0	0	6328.72	0.27	0	6328.99	1	0.006	0	1.126	5.6	1.126	5.6
95	40	2	2	1	1	5562.91	0.067	0	5562.98	20	0.347	0.019	12.309	61.5	6.393	32
96	45	2	0	1	1	6472.97	0.1	0	6473.07	0	0.001	0	1.264	6.3	1.264	6.3
97	38	1	1	0	1	6386.23	0.469	0.064	6386.77	3	0	0	0.698	3.5	2.955	14.8
98	47	5	2	1	0	6301.68	0.04	0.038	6301.75	16	0.114	0.005	4.246	21.2	4.246	21.2
99	33	2	2	1	0	6426.91	0.061	0.058	6427.03	12	0	0	4.021	20.1	4.021	20.1
100	38	3	0	0	0	6466.57	0.008	0	6466.58	0	0.001	0	0.243	1.2	0.243	1.2

Table B-21
Alternative 21 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	21	0	0	0	0	6491.51	0.075	0	6491.59	0	0	0	0	0	0	0
Max	59	6	6	1	1	7680.04	11.15	1.834	7689.42	16	0.67	0.038	9.729	48.6	6.386	31.9
Range	38	6	6	1	1	1188.53	11.075	1.834	1197.84	16	0.67	0.038	9.729	48.6	6.386	31.9
Mean	39.4	2.07	2.08	0.57	0.34	6769.14	4.18388	0.51497	6773.84	2.70408	0.04945	0.00213	4.41031	22.049	1.65222	8.25714
St Dev	7.48	1.5	1.32	0.5	0.48	229.771	2.48634	0.37673	230.859	4.37444	0.13595	0.00651	2.41691	12.0887	1.49691	7.48682
RUN																
1	43	2	1	1	0	6503.86	1.19	0	6505.05	0	0.001	0	0.581	2.9	0.581	2.9
2	33	0	3	1	0	7029.83	5.635	0.894	7036.36	0	0.153	0.009	7.616	38.1	2.112	10.6
3	28	3	2	1	0	6875.6	7.04	0.47	6883.11	0	0	0	6.333	31.7	1.758	8.8
4	36	3	2	1	0	7547.97	8.415	0.847	7557.23	0	0	0	7.027	35.1	2.16	10.8
5	34	2	0	0	0	6491.51	0.08	0	6491.59	0	0.001	0	0	0	0	0
6	57	4	3	1	0	6743.65	8.195	0.983	6752.83	0	0.001	0	6.299	31.5	1.064	5.3
7	37	2	3	1	0	6670.58	7.315	1.176	6679.07	0	0.001	0	5.853	29.3	0.709	3.5
8	48	4	3	0	0	6601.06	4.88	0.881	6606.82	0	0.001	0	3.922	19.6	0.482	2.4
9	29	0	2	1	0	6565.85	2.61	0.157	6568.62	0	0.001	0	2.065	10.3	1.208	6
10	39	3	0	1	0	6863.56	0.565	0.099	6864.23	10	0	0	5.231	26.2	3.596	18
11	43	1	3	1	1	7219.98	2.965	0.016	7222.96	10	0	0	7.32	36.6	3.229	16.1
12	43	0	3	1	1	6831.74	11.15	1.096	6843.98	0	0.001	0	7.871	39.4	0.557	2.8
13	32	1	3	0	0	6615.67	3.64	0.712	6620.03	0	0.001	0	3.865	19.3	1.241	6.2
14	33	1	1	0	0	6536.47	2.025	0.39	6538.88	0	0.001	0	1.619	8.1	0	0
15	42	4	2	0	0	6643.42	3.73	0.731	6647.88	3	0.001	0	4.877	24.4	1.377	6.9
16	28	0	1	0	1	7091.85	4.18	0.23	7096.26	0	0.001	0	2.147	10.7	0	0
17	40	1	2	1	0	6643.01	6.225	0.434	6649.67	0	0.001	0	3.969	19.8	1.865	9.3
18	41	5	3	0	0	6711.14	7.13	1.41	6719.68	0	0.011	0	6.654	33.3	1.389	6.9
19	38	1	2	1	0	7066.42	8.55	0.62	7075.59	0	0	0	5.711	28.6	1.88	9.4
20	43	0	1	1	0	6667.96	1.01	0.194	6669.16	10	0	0	3.168	15.8	3.026	15.1
21	38	2	2	0	1	6778.14	3.62	0.349	6782.11	0	0.001	0	3.278	16.4	0.687	3.4
22	37	1	2	0	1	6543.97	2.125	0.39	6546.49	0	0.001	0	2.786	13.9	0.189	0.9
23	48	3	1	1	0	6624.53	0.26	0	6624.79	10	0	0	4.13	20.6	3.604	18
24	32	2	3	1	0	6847.8	4.74	0.417	6852.96	0	0	0	5.298	26.5	0.688	3.4
25	41	1	3	1	0	6599.1	5.23	0.776	6605.1	0	0.001	0	4.223	21.1	0.7	3.5
26	49	2	0	0	0	6493.58	0.075	0	6493.65	0	0.001	0	0	0	0	0
27	46	1	2	1	0	6597	3.445	0.21	6600.66	0	0.001	0	3.215	16.1	1.32	6.6
28	34	1	1	0	1	6700.85	2.86	0.268	6703.98	0	0.001	0	1.42	7.1	0	0

Table B-21
Alternative 21 Results

29	33	2	3	0	1	6737.15	5.27	0.624	6743.04	0	0.001	0	4.14	20.7	0.061	0.3
30	45	3	0	1	0	6878.45	0.945	0.176	6879.57	0	0.448	0.024	5.289	26.4	4.275	21.4
31	47	1	3	1	0	7154.98	4.635	0.547	7160.16	3	0.261	0.012	8.557	42.8	3.537	17.7
32	38	3	4	1	0	6955.72	4.26	0.655	6960.64	10	0	0	7.546	37.7	4.274	21.4
33	34	0	1	0	0	6530.62	1.84	0.352	6532.81	0	0.001	0	1.297	6.5	0	0
34	40	5	2	0	1	6963.71	4.625	0.527	6968.87	4	0.001	0	3.241	16.2	0.508	2.5
35	40	0	2	1	0	6993.21	5.07	0.516	6998.8	13	0.044	0.002	8.534	42.7	6.386	31.9
36	44	2	1	1	0	6674.69	1.04	0.192	6675.93	10	0.001	0	3.264	16.3	3.264	16.3
37	36	1	3	1	0	7030.05	4.295	0.668	7035.01	10	0.001	0	9.729	48.6	4.924	24.6
38	43	1	2	1	0	6637.56	4.03	0.192	6641.79	4	0.001	0	0.945	4.7	1.978	9.9
39	38	5	3	1	0	6615.4	5.55	0.287	6621.24	0	0	0	2.788	13.9	0.96	4.8
40	36	2	1	1	0	6983.67	1.05	0.194	6984.92	0	0.544	0.034	5.467	27.3	2.627	13.1
41	39	1	1	1	1	6759.86	3.185	0.4	6763.45	0	0.001	0	2.38	11.9	0.183	0.9
42	40	2	2	1	0	6849.21	5.15	0.103	6854.46	0	0	0	0.243	1.2	2.013	10.1
43	32	3	4	1	1	6767.32	7.83	0.88	6776.03	0	0.001	0	5.673	28.4	1.241	6.2
44	30	3	1	0	1	7114.71	3.595	0.122	7118.43	0	0.001	0	2.309	11.5	0	0
45	28	1	1	0	0	6500.05	1.35	0.254	6501.65	0	0	0	1.308	6.5	0	0
46	59	1	4	1	1	7680.04	7.995	1.388	7689.42	0	0.001	0	9.32	46.6	3.292	16.5
47	36	0	0	0	1	6742.12	2.84	0	6744.96	0	0.001	0	1.4	7	0	0
48	26	2	1	1	1	6815.55	0.915	0.076	6816.54	0	0.592	0.038	6.448	32.2	2.462	12.3
49	38	1	4	1	0	6716.87	7.105	0.539	6724.52	4	0.001	0	5.151	25.8	1.86	9.3
50	43	2	3	1	0	6842.26	1.53	0.203	6843.99	10	0	0	7.887	39.4	3.684	18.4
51	49	2	2	0	0	6551.3	3.23	0.327	6554.86	0	0.001	0	2.884	14.4	0.648	3.2
52	53	0	3	1	1	6888.7	5.715	0.378	6894.8	0	0.001	0	6.065	30.3	2.328	11.6
53	37	2	5	1	1	6784.4	5.29	0.944	6790.63	10	0.001	0	6.697	33.5	2.947	14.7
54	39	2	2	1	1	7140.03	3.89	0	7143.92	2	0	0	4.44	22.2	1.986	9.9
55	27	1	0	0	0	6497.81	0.08	0	6497.89	0	0	0	0	0	0	0
56	45	4	1	0	0	6580.92	3.475	0.679	6585.08	0	0.001	0	2.865	14.3	0.079	0.4
57	34	5	0	1	0	6512.33	1.25	0.198	6513.78	0	0.001	0	0.846	4.2	0.151	0.8
58	35	3	2	0	1	7283.56	5.16	0.429	7289.15	0	0.001	0	4.259	21.3	0.055	0.3
59	38	1	0	0	0	6496.11	0.08	0	6496.19	0	0.001	0	0	0	0	0
60	40	1	0	0	1	6529.64	1.96	0.097	6531.7	0	0.001	0	0.936	4.7	0	0
61	21	3	4	1	1	7042.52	5.625	0.924	7049.07	0	0.02	0.001	4.729	23.6	3.607	18
62	29	6	2	1	1	7055.98	5.675	0.547	7062.2	0	0	0	6.159	30.8	0.883	4.4
63	54	4	2	0	1	6797.64	6.47	0.577	6804.69	1	0.054	0.002	4.309	21.5	0.925	4.6
64	40	5	3	1	0	6722.4	8.26	1.002	6731.66	3	0.308	0.011	6.093	30.5	3.239	16.2
65	54	1	6	0	0	6864.3	9.25	1.834	6875.39	3	0.48	0.012	9.487	47.4	1.754	8.8
66	40	1	1	1	1	6966.23	5.085	0.487	6971.81	10	0	0	6.281	31.4	3.496	17.5

Table B-21
Alternative 21 Results

67	35	1	2	0	0	6538.28	3.005	0.59	6541.87	0	0.001	0	2.087	10.4	0	0
68	36	1	2	0	0	6574.07	3.15	0.614	6577.83	0	0.004	0	2.816	14.1	0.567	2.8
69	33	6	1	1	0	6594.28	4.545	0.359	6599.18	0	0.001	0	3.371	16.9	1.369	6.8
70	50	0	3	0	0	6571.58	4.235	0.71	6576.53	4	0.001	0	3.189	15.9	0.587	2.9
71	40	0	2	1	1	6826.92	1.53	0.29	6828.74	10	0.001	0	5.837	29.2	3.405	17
72	39	3	5	0	0	6636.63	6.4	1.265	6644.3	2	0.363	0.012	6.825	34.1	2.671	13.4
73	45	2	4	0	0	6548.62	3.445	0.456	6552.52	0	0.001	0	2.817	14.1	0.893	4.5
74	34	1	2	0	1	6581.05	5.6	0.669	6587.32	0	0	0	3.413	17.1	0.138	0.7
75	41	1	4	0	0	6541.52	2.9	0.565	6544.98	1	0.217	0.008	3.863	19.3	1.143	5.7
76	38	1	3	0	0	6604.09	3.26	0.549	6607.9	0	0.106	0.004	2.979	14.9	0.62	3.1
77	33	2	0	0	1	6523.24	1.545	0.288	6525.07	0	0.001	0	0.755	3.8	0	0
78	55	3	3	1	0	6712.73	9.15	1.201	6723.08	0	0.001	0	6.757	33.8	1.899	9.5
79	40	1	1	1	1	6857.54	8.535	0.67	6866.75	0	0.001	0	5.342	26.7	1.48	7.4
80	37	5	1	0	0	6547.3	3.345	0.655	6551.3	0	0.022	0.001	2.561	12.8	0.65	3.2
81	49	2	1	1	0	6801.05	3.03	0.035	6804.11	10	0	0	4.693	23.5	3.362	16.8
82	37	4	2	1	0	6822.53	3.175	0.387	6826.09	10	0	0	6.511	32.6	4.137	20.7
83	33	1	2	1	0	6776.46	5.62	0.617	6782.69	10	0	0	5.99	29.9	2.93	14.7
84	53	1	2	0	1	6936.81	6.075	0.922	6943.81	0	0.001	0	5.759	28.8	0	0
85	37	2	4	1	1	7197.53	8.105	1.044	7206.67	1	0.002	0	8.572	42.9	1.341	6.7
86	39	3	1	0	0	6528.95	2.09	0.404	6531.44	0	0.001	0	1.57	7.8	0	0
87	42	3	2	0	0	6550.55	0.785	0.144	6551.48	9	0.001	0	2.798	14	2.711	13.6
88	27	2	1	1	0	6787.45	0.395	0.064	6787.91	10	0	0	4.773	23.9	3.052	15.3
89	38	0	5	0	0	6729.13	6.37	1.266	6736.76	1	0.134	0.005	6.163	30.8	2.1	10.5
90	45	5	0	1	0	6951.46	3.995	0.571	6956.03	0	0.001	0	5.074	25.4	1.04	5.2
91	27	2	1	0	1	6676.22	4.33	0.275	6680.83	0	0.001	0	2.412	12.1	0	0
92	40	1	2	1	1	6907.59	5.87	0.272	6913.73	1	0.04	0.002	3.423	17.1	2.113	10.6
93	48	1	1	1	0	6665.06	2.235	0.368	6667.66	10	0.001	0	5.821	29.1	3.067	15.3
94	53	1	4	1	0	6954.63	2.14	0.423	6957.19	10	0	0	7.162	35.8	4.896	24.5
95	43	3	2	0	1	6705.62	5.505	1.071	6712.2	1	0.102	0.004	4.599	23	1.012	5.1
96	44	3	3	1	0	6581.96	4.97	0.826	6587.75	4	0.034	0.001	3.907	19.5	1.061	5.3
97	41	2	3	1	0	6703.49	3.49	0.693	6707.68	15	0.315	0.013	5.976	29.9	4.4	22
98	26	3	1	0	0	6516.09	1.75	0.336	6518.18	0	0.001	0	0.999	5	0	0
99	48	3	2	1	0	6942.54	4.34	0.802	6947.68	16	0.67	0.022	9.032	45.2	4.052	20.3
100	43	4	3	1	1	6753.68	8.445	0.892	6763.01	0	0.023	0.001	7.117	35.6	2.866	14.3

Table B-22
Alternative 22 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	24	0	0	0	0	6468.99	0.63	0.088	6469.75	0	0	0	0	0	0	0
Max	59	5	5	1	1	7834.35	11.035	1.49	7844.05	13	0.921	0.038	9.522	47.6	6.341	31.7
Range	35	5	5	1	1	1365.35	10.405	1.402	1374.3	13	0.921	0.038	9.522	47.6	6.341	31.7
Mean	39.2	2.08	1.98	0.59	0.38	6834.97	4.55878	0.53445	6840.07	2.30612	0.04876	0.00237	4.09813	20.4898	1.603	8.0102
St Dev	6.64	1.39	1.22	0.49	0.49	246.065	2.29269	0.31654	247.253	3.89904	0.15786	0.00796	2.39125	11.9505	1.52262	7.61425
RUN																
1	43	2	1	1	0	6483.41	2.265	0.228	6485.9	0	0.001	0	0.581	2.9	0.581	2.9
2	33	0	3	1	0	7072.49	5.825	0.881	7079.19	0	0.173	0.01	7.402	37	2.213	11.1
3	28	3	2	1	0	6912.05	7.105	0.42	6919.58	0	0.001	0	6.216	31.1	1.602	8
4	36	3	2	1	0	7570.5	8.535	0.499	7579.54	0	0	0	6.85	34.2	2.16	10.8
5	34	2	0	0	0	6472.57	1.215	0.241	6474.02	0	0.001	0	0	0	0	0
6	57	4	3	1	0	6952.16	8.555	0.818	6961.53	0	0.001	0	6.107	30.5	0.464	2.3
7	37	2	3	1	0	6737.92	7.725	1.258	6746.9	0	0.001	0	5.73	28.6	0.709	3.5
8	48	4	3	0	0	6637.41	4.995	0.911	6643.32	0	0.001	0	3.486	17.4	0.39	1.9
9	29	0	2	1	0	6545.6	2.965	0.194	6548.76	0	0.001	0	2.025	10.1	1.208	6
10	39	3	0	1	0	6852.41	0.98	0.188	6853.58	10	0	0	5.231	26.2	3.596	18
11	43	1	3	1	1	7198.31	3.29	0.091	7201.69	10	0	0	7.2	36	3.229	16.1
12	43	0	3	1	1	7021.58	10.35	0.933	7032.87	0	0.001	0	7.063	35.3	0.165	0.8
13	32	1	3	0	0	6704.97	3.68	0.734	6709.38	0	0.001	0	3.701	18.5	1.241	6.2
14	33	1	1	0	0	6553.39	2.48	0.481	6556.36	0	0.001	0	1.532	7.7	0	0
15	42	4	2	0	0	6809.89	4.135	0.688	6814.72	3	0.001	0	4.736	23.7	1.098	5.5
16	28	0	1	0	1	7077.82	4.62	0.333	7082.77	0	0.001	0	2.186	10.9	0	0
17	40	1	2	1	0	6654.53	6.825	0.563	6661.91	0	0.001	0	4.013	20.1	1.805	9
18	41	5	3	0	0	6829.47	7.405	1.465	6838.34	0	0.011	0	6.09	30.5	1.062	5.3
19	38	1	2	1	0	7061.87	9.05	0.681	7071.6	0	0	0	5.455	27.3	1.88	9.4
20	43	0	1	1	0	6678.55	1.195	0.236	6679.98	10	0	0	3.208	16	3.026	15.1
21	38	2	2	0	1	6819.45	3.875	0.401	6823.73	0	0.001	0	3.015	15.1	0.687	3.4
22	37	1	2	0	1	6557.25	2.715	0.521	6560.49	0	0.001	0	2.785	13.9	0.189	0.9
23	48	3	1	1	0	6600.75	0.795	0.098	6601.64	10	0	0	4.124	20.6	3.644	18.2
24	32	2	3	1	0	6853.27	5.415	0.552	6859.23	0	0	0	5.249	26.2	0.688	3.4
25	41	1	3	1	0	6644.23	5.7	0.873	6650.81	0	0.001	0	4.063	20.3	0.7	3.5
26	49	2	0	0	0	6468.99	0.63	0.124	6469.75	0	0.001	0	0	0	0	0
27	46	1	2	1	0	6601.68	4.575	0.423	6606.68	0	0.001	0	3.215	16.1	1.28	6.4
28	34	1	1	0	1	6683.55	3.725	0.409	6687.69	0	0.001	0	1.444	7.2	0	0

Table B-22
Alternative 22 Results

29	33	2	3	0	1	6768.41	5.125	0.597	6774.13	0	0.001	0	3.738	18.7	0	0
30	45	3	0	1	0	6864.62	1.67	0.186	6866.47	0	0.458	0.024	5.299	26.5	4.285	21.4
31	47	1	3	1	0	7188.46	5.055	0.602	7194.12	3	0.258	0.012	8.583	42.9	3.535	17.7
32	38	3	4	1	0	6982.4	4.185	0.625	6987.21	10	0	0	7.289	36.4	4.274	21.4
33	34	0	1	0	0	6574.27	2.085	0.415	6576.77	0	0.001	0	1.235	6.2	0	0
34	40	5	2	0	1	6963.09	5.42	0.683	6969.19	4	0.001	0	3.137	15.7	0.508	2.5
35	40	0	2	1	0	7019.72	4.925	0.467	7025.11	13	0.044	0.002	8.249	41.2	6.341	31.7
36	44	2	1	1	0	6685.07	1.86	0.37	6687.3	10	0.001	0	3.224	16.1	3.224	16.1
37	36	1	3	1	0	7079.84	4.34	0.561	7084.74	10	0.001	0	9.522	47.6	4.964	24.8
38	43	1	2	1	0	6636.46	4.605	0.313	6641.37	4	0.001	0	0.945	4.7	1.978	9.9
39	38	5	3	1	0	6600.05	5.885	0.36	6606.29	0	0	0	2.636	13.2	0.96	4.8
40	36	2	1	1	0	6998.46	1.59	0.278	7000.33	0	0.507	0.032	5.471	27.4	2.631	13.2
41	39	1	1	1	1	6846.07	3.99	0.574	6850.64	0	0.001	0	2.413	12.1	0.183	0.9
42	40	2	2	1	0	6833.46	5.68	0.212	6839.35	0	0	0	0.258	1.3	2.013	10.1
43	32	3	4	1	1	6833.32	7.315	0.783	6841.41	0	0.001	0	4.985	24.9	1.241	6.2
44	30	3	1	0	1	7100.27	4.96	0.404	7105.63	0	0.001	0	2.495	12.5	0	0
45	28	1	1	0	0	6496.31	1.71	0.342	6498.37	0	0	0	1.154	5.8	0	0
46	59	1	4	1	1	7834.35	8.61	1.087	7844.05	0	0.001	0	9.061	45.3	3.179	15.9
47	36	0	0	0	1	6721.34	3.535	0.148	6725.03	0	0.001	0	1.4	7	0	0
48	26	2	1	1	1	6803.81	1.395	0.178	6805.39	0	0.592	0.038	6.518	32.6	2.462	12.3
49	38	1	4	1	0	6794.63	7.47	0.602	6802.7	4	0.001	0	5.162	25.8	1.82	9.1
50	43	2	3	1	0	6860.07	1.925	0.283	6862.28	10	0	0	7.887	39.4	3.684	18.4
51	49	2	2	0	0	6550.33	4.44	0.554	6555.33	0	0.001	0	2.606	13	0.28	1.4
52	53	0	3	1	1	6914.28	5.97	0.419	6920.66	0	0.001	0	6	30	2.248	11.2
53	38	2	5	1	1	6879.76	4.96	0.866	6885.59	10	0.001	0	6.874	34.4	2.701	13.5
54	56	1	1	1	0	6801.43	2.835	0.421	6804.68	10	0.001	0	5.35	26.7	4.397	22
55	44	1	5	0	1	7065.62	9.06	1.343	7076.02	0	0.001	0	5.686	28.4	0	0
56	32	2	1	0	1	6926.51	6.055	0.65	6933.22	0	0	0	2.823	14.1	0	0
57	46	2	2	1	0	6903.26	3.185	0.386	6906.84	0	0.001	0	1.265	6.3	2.867	14.3
58	44	3	1	1	0	6806.21	4.74	0.534	6811.48	0	0	0	2.8	14	0.319	1.6
59	42	1	3	1	0	6747.43	2.95	0.371	6750.75	0	0.079	0.004	4.456	22.3	1.592	8
60	32	0	2	0	0	6555.33	2.325	0.462	6558.12	4	0.727	0.038	3.145	15.7	1.483	7.4
61	42	1	1	1	0	6918.11	4.195	0.257	6922.56	0	0	0	0.692	3.5	2.871	14.4
62	33	3	2	1	0	6781.29	3.115	0.487	6784.9	4	0.446	0.023	6.446	32.2	3.767	18.8
63	36	1	2	1	1	7103.38	2.07	0.095	7105.55	10	0	0	8.518	42.6	4.277	21.4
64	24	2	3	0	1	7070.91	4.39	0.184	7075.49	2	0.001	0	2.76	13.8	0.631	3.2
65	44	1	3	0	0	6576.27	3.705	0.602	6580.58	2	0.323	0.013	2.282	11.4	0.717	3.6
66	34	2	2	1	0	7013.79	6.83	0.74	7021.36	0	0.001	0	6.509	32.5	1.957	9.8

Table B-22
Alternative 22 Results

67	41	1	1	1	1	6953.96	3.305	0.582	6957.84	10	0.001	0	5.073	25.4	3.456	17.3
68	40	2	2	0	0	6538.44	3.125	0.518	6542.08	0	0.001	0	2.24	11.2	0	0
69	38	4	2	0	0	6556.14	3.435	0.685	6560.26	4	0.16	0.006	2.72	13.6	1.129	5.6
70	44	2	2	0	0	6570.02	2.61	0.503	6573.13	0	0.001	0	1.6	8	0.24	1.2
71	31	3	0	1	1	7066.93	9.07	0.66	7076.66	0	0.001	0	4.618	23.1	1.053	5.3
72	49	5	3	0	1	6766.2	5.44	0.87	6772.51	7	0.172	0.005	5.476	27.4	1.988	9.9
73	47	1	1	1	1	6715.41	4.515	0.131	6720.06	0	0.001	0	0.011	0.1	2.047	10.2
74	42	2	0	1	1	6648.92	2.7	0.225	6651.84	10	0.001	0	3.843	19.2	2.893	14.5
75	37	3	3	1	0	7267.42	2.295	0.099	7269.81	10	0	0	8.16	40.8	3.121	15.6
76	36	0	2	1	1	6665.21	5.58	0.388	6671.17	0	0.001	0	3	15	0.595	3
77	34	5	1	0	1	6940.29	5.365	0.581	6946.23	0	0.001	0	3.373	16.9	0	0
78	35	3	2	1	1	6811.58	6.075	0.735	6818.39	0	0.001	0	3.731	18.7	0.897	4.5
79	43	2	3	1	0	6843.34	4.95	0.83	6849.12	2	0.002	0	4.541	22.7	0.709	3.5
80	37	4	3	1	0	6829.81	9.685	0.744	6840.24	0	0.921	0.035	7.606	38	3.459	17.3
81	45	2	3	0	1	6647.23	4.305	0.498	6652.03	5	0.001	0	4.433	22.2	1.46	7.3
82	38	1	1	0	0	6649.31	2.835	0.566	6652.71	0	0.001	0	1.651	8.3	0	0
83	47	5	2	1	0	6905.44	5.995	0.791	6912.23	0	0.001	0	3.221	16.1	1.964	9.8
84	40	3	0	0	1	6801.04	3.385	0.425	6804.85	0	0.001	0	1.315	6.6	0	0
85	46	2	0	0	1	6797.39	3.99	0.33	6801.71	0	0.001	0	1.939	9.7	0	0
86	43	4	3	0	0	6764.23	6.835	1.151	6772.22	0	0.001	0	4.473	22.4	0.891	4.5
87	34	3	1	1	1	7437.19	6	0.261	7443.45	0	0	0	1.721	8.6	4.312	21.6
88	36	2	2	1	0	7229.59	6.31	1.033	7236.93	1	0.009	0	7.891	39.5	1.563	7.8
89	40	2	1	1	0	6959.12	2.935	0.282	6962.34	10	0.001	0	7.368	36.8	4.761	23.8
90	38	2	2	1	1	7237.45	4.63	0.494	7242.57	0	0	0	4.125	20.6	1.005	5
91	42	4	4	0	0	6744.83	5.685	1.136	6751.65	0	0.001	0	4.843	24.2	1.14	5.7
92	40	3	1	1	1	6506.29	2.15	0.349	6508.79	0	0.001	0	1.275	6.4	0.218	1.1
93	32	1	2	1	0	6745.77	3.265	0.088	6749.12	0	0	0	0	0	2.764	13.8
94	38	4	2	0	1	6962.33	6.105	0.975	6969.41	0	0.001	0	4.246	21.2	0.243	1.2
95	32	4	5	0	1	7382.51	11.035	1.49	7395.03	4	0.001	0	7.995	40	0.852	4.3
96	35	1	1	0	0	6501.96	2.025	0.403	6504.38	0	0.001	0	0.929	4.6	0	0
97	35	1	0	1	0	6837.3	1.245	0.137	6838.68	10	0	0	7	35	4.828	24.1
98	28	5	1	0	0	6607.4	2.625	0.522	6610.55	0	0.008	0	1.733	8.7	0.326	1.6
99	35	4	4	0	0	6731.67	6.895	1.144	6739.71	0	0.001	0	4.47	22.3	0.968	4.8
100	49	1	0	0	1	6607.04	3.665	0.174	6610.88	0	0.001	0	1.4	7	0	0

Table B-23
Alternative 23 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	24	0	0	0	0	5531.32	0	0	5531.8	0	0	0	0	0	0	0
Max	55	7	6	1	1	6921.21	0.763	0.176	6921.29	23	0.997	0.044	14.059	70.3	7.141	35.7
Range	31	7	6	1	1	1389.89	0.763	0.176	1389.49	23	0.997	0.044	14.059	70.3	7.141	35.7
Mean	38.3	1.93	2.01	0.53	0.54	6357.2	0.16983	0.01673	6357.38	7.16327	0.09992	0.00457	6.45524	32.2796	2.53894	12.7
St Dev	5.99	1.47	1.29	0.5	0.5	239.979	0.16077	0.03601	239.958	6.41554	0.17916	0.00825	3.49669	17.4874	1.81727	9.08239
RUN																
1	43	2	1	1	0	6466.15	0.046	0	6466.2	0	0.001	0	0.581	2.9	0.581	2.9
2	33	0	3	1	0	6482.87	0.134	0	6483.01	10	0	0	9.966	49.8	3.396	17
3	34	2	3	0	0	6371.93	0.152	0	6372.08	4	0.001	0	3.759	18.8	0.612	3.1
4	48	2	5	0	1	6108.81	0.016	0.016	6108.85	11	0.304	0.01	9.058	45.3	2.27	11.4
5	43	1	3	0	1	6084.49	0.042	0	6084.53	0	0.261	0.009	8.677	43.4	1.819	9.1
6	46	2	6	0	1	5986.09	0.763	0	5986.85	23	0.022	0.001	10.697	53.5	5.061	25.3
7	50	2	1	0	0	6454.98	0.094	0	6455.08	0	0.001	0	1.929	9.6	0.153	0.8
8	36	1	1	1	0	6482.54	0.165	0	6482.7	0	0	0	2.044	10.2	2.044	10.2
9	36	1	2	1	1	6814.22	0.314	0.016	6814.55	10	0.001	0	11.876	59.4	4.41	22
10	42	2	0	1	0	6650.63	0.371	0.016	6651.02	10	0.001	0	6.661	33.3	2.499	12.5
11	37	2	1	0	1	6642.66	0.055	0	6642.71	0	0.001	0	7.936	39.7	0	0
12	35	1	3	1	0	6321.45	0.042	0.041	6321.53	10	0.109	0.006	6.784	33.9	3.902	19.5
13	42	3	3	1	0	6259.33	0.05	0.032	6259.41	13	0.013	0.001	8.531	42.7	4.571	22.9
14	30	2	2	1	0	6187.02	0.145	0	6187.17	14	0.129	0.006	6.264	31.3	3.86	19.3
15	36	3	0	1	1	6497.56	0.186	0.176	6497.92	10	0.001	0	2.546	12.7	2.223	11.1
16	37	3	3	0	1	6106.87	0.281	0	6107.15	4	0.058	0.002	7.36	36.8	1.452	7.3
17	34	0	6	0	1	5531.32	0.483	0	5531.8	20	0.186	0.01	13.372	66.9	4.18	20.9
18	36	0	0	0	1	6509.16	0.164	0.096	6509.42	0	0.001	0	2.08	10.4	0	0
19	41	2	3	0	1	6089.79	0.02	0.016	6089.83	2	0.261	0.01	11.209	56	2.253	11.3
20	36	3	2	1	1	6309.67	0.19	0	6309.86	15	0.001	0	7.838	39.2	3.411	17.1
21	41	1	2	0	1	6420.91	0.057	0	6420.96	0	0.001	0	1.976	9.9	0.167	0.8
22	47	3	2	1	0	6346.46	0.033	0	6346.49	0	0.001	0	4.697	23.5	1.77	8.9
23	39	1	3	1	1	6447.77	0.04	0.016	6447.83	11	0.306	0.015	9.822	49.1	2.908	14.5
24	45	0	1	1	0	6433.58	0.101	0	6433.68	11	0.279	0.011	3.982	19.9	2.835	14.2
25	32	1	4	1	0	6033.55	0.031	0	6033.58	6	0.122	0.005	5.666	28.3	2.351	11.8
26	33	2	0	0	1	6602.68	0.108	0	6602.78	0	0.001	0	2.334	11.7	0	0
27	33	1	2	1	1	6684.61	0.284	0	6684.89	12	0	0	10.913	54.6	5.917	29.6
28	37	3	3	1	0	6169.42	0.084	0	6169.5	11	0.432	0.022	5.591	28	3.205	16

Table B-23
Alternative 23 Results

29	41	5	3	0	0	5818.96	0.418	0	5819.38	16	0.997	0.044	5.76	28.8	4.646	23.2
30	28	3	2	1	1	6116.15	0.105	0	6116.26	17	0.021	0.002	11.061	55.3	6.358	31.8
31	43	2	2	0	1	6513.06	0.094	0	6513.15	0	0.001	0	6.253	31.3	0.384	1.9
32	34	2	4	0	1	5918.67	0.093	0	5918.76	13	0.2	0.01	13.171	65.9	4.12	20.6
33	39	4	1	1	1	6685.68	0.337	0.016	6686.03	10	0.001	0	10.153	50.8	2.405	12
34	34	2	2	0	1	6131.07	0.253	0	6131.32	9	0.711	0.034	13.819	69.1	3.641	18.2
35	34	1	2	1	0	6410.17	0.144	0.128	6410.44	14	0.198	0.013	5.281	26.4	4.328	21.6
36	49	5	2	0	0	6350.73	0.611	0	6351.34	5	0.132	0.004	4.216	21.1	2.639	13.2
37	40	0	1	1	1	6526.42	0.098	0	6526.52	10	0.001	0	10.5	52.5	2.655	13.3
38	41	1	1	0	0	6344.74	0.019	0.016	6344.78	0	0.001	0	2.296	11.5	0.296	1.5
39	29	3	2	1	0	6303.36	0.281	0	6303.64	10	0.119	0.006	7.156	35.8	4.693	23.5
40	27	2	2	0	0	6417.94	0.003	0	6417.94	0	0.059	0.004	3.316	16.6	1.012	5.1
41	31	2	2	0	1	6365.1	0.129	0	6365.23	4	0.054	0.003	7.007	35	0.716	3.6
42	55	4	1	0	0	6445.19	0.001	0	6445.19	0	0.001	0	3.019	15.1	0.224	1.1
43	46	0	2	0	0	6455.68	0.156	0	6455.83	0	0.001	0	2.484	12.4	0.536	2.7
44	45	0	1	0	1	6436.33	0.115	0	6436.44	0	0.001	0	3.256	16.3	0	0
45	29	0	1	0	1	6311.74	0.105	0.089	6311.93	0	0.001	0	3.101	15.5	0.038	0.2
46	33	1	1	0	0	6444.54	0.003	0	6444.55	0	0.001	0	0.862	4.3	0	0
47	24	1	3	1	1	6584.31	0.274	0.084	6584.67	12	0	0	11.556	57.8	3.947	19.7
48	49	2	1	1	0	6568.32	0.264	0	6568.59	10	0.001	0	8.341	41.7	2.854	14.3
49	48	0	0	1	1	6514.67	0.091	0.064	6514.82	10	0.001	0	3.285	16.4	3.139	15.7
50	38	4	1	1	0	6323.47	0.014	0	6323.49	11	0.001	0	6.519	32.6	3.606	18
51	37	4	2	1	1	6313.08	0.05	0	6313.13	10	0.001	0	5.988	29.9	2.686	13.4
52	39	3	2	0	1	6103.68	0.089	0	6103.77	5	0.311	0.013	10.728	53.6	2.515	12.6
53	40	0	0	1	0	6635.33	0.429	0.016	6635.78	10	0	0	7.134	35.7	2.874	14.4
54	29	3	0	0	1	6462.57	0.025	0	6462.59	0	0.001	0	0.582	2.9	0	0
55	37	2	3	1	1	6112.9	0.215	0.016	6113.13	11	0.002	0	9.989	49.9	4.944	24.7
56	41	3	4	0	0	5857.42	0.709	0	5858.13	20	0.456	0.023	6.875	34.4	6.801	34
57	39	1	1	1	1	6921.21	0.02	0.066	6921.29	0	0.001	0	7.092	35.5	2.053	10.3
58	35	1	2	0	0	6113.87	0	0	6113.87	2	0.144	0.007	3.965	19.8	1.531	7.7
59	42	2	2	1	0	6312.16	0.067	0	6312.22	15	0.124	0.006	4.558	22.8	2.834	14.2
60	42	2	2	0	1	6609.14	0.325	0	6609.47	0	0.001	0	10.293	51.5	0	0
61	38	2	2	0	1	6593.22	0.007	0	6593.22	7	0.319	0.014	9.645	48.2	1.761	8.8
62	29	4	1	1	0	6433.89	0.208	0	6434.1	0	0	0	6.339	31.7	3.44	17.2
63	38	0	1	1	0	6418.91	0.1	0.032	6419.04	10	0	0	5.574	27.9	3.446	17.2
64	39	0	1	1	0	6508.65	0.033	0	6508.68	10	0	0	5.527	27.6	2.24	11.2
65	34	4	0	0	1	6476.14	0.099	0	6476.24	0	0	0	1.711	8.6	0	0
66	34	0	2	0	0	6390.62	0.03	0	6390.65	0	0.001	0	2.668	13.3	0	0

Table B-23
Alternative 23 Results

67	36	0	1	0	0	6429.73	0.001	0	6429.73	0	0.001	0	0.823	4.1	0	0
68	48	0	2	1	0	6210.5	0.587	0	6211.09	17	0	0	8.299	41.5	3.092	15.5
69	39	3	3	0	0	6308.99	0.379	0	6309.37	4	0.001	0	4.536	22.7	1.403	7
70	43	3	2	1	1	6603.47	0.119	0	6603.59	10	0.001	0	8.473	42.4	3.358	16.8
71	46	1	1	0	0	6436.05	0.017	0.016	6436.08	0	0.084	0.004	1.888	9.4	0.212	1.1
72	38	0	2	1	1	6072.23	0.288	0	6072.52	14	0.348	0.017	11.166	55.8	5.742	28.7
73	34	1	1	1	0	6458.94	0.105	0	6459.04	0	0.001	0	2.675	13.4	1.929	9.6
74	36	7	2	1	1	6541.13	0.363	0	6541.5	10	0	0	11.458	57.3	3.897	19.5
75	38	3	1	1	1	6344.18	0.287	0	6344.47	1	0.326	0.015	6.312	31.6	3.633	18.2
76	40	2	3	0	1	6336.41	0.115	0	6336.52	5	0.676	0.028	10.191	51	2.608	13
77	48	2	3	1	1	6373.28	0.488	0	6373.76	23	0.005	0	7.16	35.8	4.667	23.3
78	41	1	2	1	0	6408.7	0.047	0.017	6408.76	2	0.001	0	1.918	9.6	1.056	5.3
79	30	2	5	0	1	5887.82	0.059	0.025	5887.9	13	0.525	0.028	6.602	33	4.485	22.4
80	34	5	0	1	1	6644.48	0.088	0.016	6644.59	10	0	0	7.22	36.1	3.577	17.9
81	47	1	2	1	0	6459.65	0.092	0.089	6459.83	10	0.001	0	5.831	29.2	4.543	22.7
82	39	1	3	0	1	5669.16	0.132	0	5669.29	12	0.065	0.003	14.059	70.3	3.249	16.2
83	33	3	3	0	1	6464.35	0.098	0	6464.45	1	0.225	0.009	10.901	54.5	1.674	8.4
84	37	3	1	0	0	6453.47	0.164	0	6453.63	0	0.001	0	1.925	9.6	0.656	3.3
85	30	1	3	1	1	6367.19	0.026	0	6367.22	0	0.004	0	6.85	34.2	0.491	2.5
86	38	2	2	1	1	6822.56	0.059	0	6822.61	0	0	0	0	0	3.911	19.6
87	33	1	1	0	1	6406.92	0.168	0.016	6407.1	0	0.001	0	4.041	20.2	0	0
88	42	4	4	1	1	6107.96	0.273	0.032	6108.27	11	0.329	0.013	7.468	37.3	4.059	20.3
89	48	1	0	1	0	6487.26	0.131	0.128	6487.52	10	0.001	0	2.09	10.4	2.09	10.4
90	41	4	1	1	1	6637.14	0.437	0	6637.58	1	0.134	0.006	8.743	43.7	2.491	12.5
91	40	2	3	0	0	6328.34	0.027	0.032	6328.4	6	0.008	0	3.881	19.4	1.279	6.4
92	42	0	0	1	0	6553.99	0.183	0.176	6554.35	10	0	0	4.09	20.5	4.09	20.5
93	40	2	3	1	0	6236.49	0.166	0	6236.65	14	0	0	9.194	46	4.844	24.2
94	29	4	4	1	1	6150.34	0.166	0.016	6150.52	19	0.255	0.012	13.739	68.7	5.68	28.4
95	40	2	3	1	1	6552.37	0.161	0.036	6552.57	2	0.001	0	5.539	27.7	0.672	3.4
96	32	5	3	1	0	6068.94	0.173	0	6069.11	16	0.352	0.018	10.7	53.5	4.853	24.3
97	34	0	2	1	1	6528.62	0.4	0	6529.02	16	0.002	0	5.591	28	7.141	35.7
98	43	0	2	0	0	6395.2	0.15	0	6395.35	0	0.001	0	3.31	16.6	0.177	0.9
99	35	1	3	0	0	6164.15	0.265	0.016	6164.43	8	0.059	0.003	5.097	25.5	2.4	12
100	47	3	3	0	1	6298.79	0.144	0.073	6299	9	0.027	0.001	6.162	30.8	1.622	8.1

Table B-24
Alternative 24 Results

	M1	M2	M3	WW	CW	Maint Cost	Buildup Cost	Demob Cost	Total Cost	Interest Lost	Duration Penalty	Penalty/ Proj Dur	TF - TF Req	TF - TF Req (%)	TF - Act Req	TF - Act Req (%)
Min	24	0	0	0	0	5531.32	0	0	5531.8	0	0	0	0	0	0	0
Max	55	7	6	1	1	6932.04	0.757	0.189	6932.09	23	0.997	0.044	14.084	70.4	7.141	35.7
Range	31	7	6	1	1	1400.72	0.757	0.189	1400.29	23	0.997	0.044	14.084	70.4	7.141	35.7
Mean	38.3	1.93	2.01	0.53	0.54	6358.71	0.17189	0.01707	6358.9	7.12245	0.09952	0.00455	6.45381	32.2704	2.54347	12.7224
St Dev	5.99	1.47	1.29	0.5	0.5	241.399	0.16268	0.03735	241.375	6.38576	0.18007	0.00831	3.49452	17.4746	1.82612	9.12766
RUN																
1	43	2	1	1	0	6466.15	0.046	0	6466.2	0	0.001	0	0.581	2.9	0.581	2.9
2	33	0	3	1	0	6482.87	0.134	0	6483.01	10	0	0	9.966	49.8	3.396	17
3	34	2	3	0	0	6371.52	0.152	0.003	6371.68	4	0.001	0	3.759	18.8	0.612	3.1
4	48	2	5	0	1	6124.33	0.019	0.016	6124.37	11	0.176	0.006	9.007	45	2.263	11.3
5	43	1	3	0	1	6084.49	0.042	0	6084.53	0	0.261	0.009	8.677	43.4	1.819	9.1
6	46	2	6	0	1	5980.06	0.757	0.007	5980.82	23	0.022	0.001	10.697	53.5	5.118	25.6
7	50	2	1	0	0	6454.98	0.094	0	6455.08	0	0.001	0	1.929	9.6	0.153	0.8
8	36	1	1	1	0	6482.54	0.165	0	6482.7	0	0	0	2.044	10.2	2.044	10.2
9	36	1	2	1	1	6821.08	0.314	0.003	6821.4	10	0.001	0	11.876	59.4	4.41	22
10	42	2	0	1	0	6657.26	0.371	0.003	6657.64	10	0.001	0	6.661	33.3	2.499	12.5
11	37	2	1	0	1	6642.66	0.055	0	6642.71	0	0.001	0	7.936	39.7	0	0
12	35	1	3	1	0	6327.63	0.041	0.04	6327.71	10	0.07	0.004	6.759	33.8	3.902	19.5
13	42	3	3	1	0	6260.06	0.05	0.026	6260.14	13	0.013	0.001	8.531	42.7	4.571	22.9
14	30	2	2	1	0	6187.02	0.145	0	6187.17	14	0.129	0.006	6.264	31.3	3.86	19.3
15	36	3	0	1	1	6515.06	0.193	0.189	6515.45	10	0.001	0	2.546	12.7	2.223	11.1
16	37	3	3	0	1	6106.87	0.281	0	6107.15	4	0.058	0.002	7.36	36.8	1.452	7.3
17	34	0	6	0	1	5531.32	0.483	0	5531.8	20	0.186	0.01	13.372	66.9	4.18	20.9
18	36	0	0	0	1	6514.78	0.164	0.102	6515.05	0	0.001	0	2.08	10.4	0	0
19	41	2	3	0	1	6070.21	0.03	0.025	6070.26	3	0.362	0.014	11.209	56	2.24	11.2
20	36	3	2	1	1	6309.67	0.19	0	6309.86	15	0.001	0	7.838	39.2	3.411	17.1
21	41	1	2	0	1	6420.91	0.057	0	6420.96	0	0.001	0	1.976	9.9	0.167	0.8
22	47	3	2	1	0	6337.75	0.017	0.016	6337.78	0	0.001	0	4.697	23.5	1.77	8.9
23	39	1	3	1	1	6468.3	0.05	0.003	6468.36	10	0.247	0.012	9.822	49.1	2.721	13.6
24	45	0	1	1	0	6433.58	0.101	0	6433.68	11	0.279	0.011	3.982	19.9	2.835	14.2
25	32	1	4	1	0	6033.55	0.031	0	6033.58	6	0.122	0.005	5.666	28.3	2.351	11.8
26	33	2	0	0	1	6602.68	0.108	0	6602.78	0	0.001	0	2.334	11.7	0	0
27	33	1	2	1	1	6683.91	0.3	0.016	6684.22	12	0	0	10.955	54.8	5.917	29.6
28	37	3	3	1	0	6169.42	0.084	0	6169.5	11	0.432	0.022	5.591	28	3.205	16

Table B-24
Alternative 24 Results

29	41	5	3	0	0	5818.96	0.418	0	5819.38	16	0.997	0.044	5.76	28.8	4.646	23.2
30	28	3	2	1	1	6116.15	0.105	0	6116.26	17	0.021	0.002	11.061	55.3	6.358	31.8
31	43	2	2	0	1	6513.06	0.094	0	6513.15	0	0.001	0	6.253	31.3	0.384	1.9
32	34	2	4	0	1	5918.67	0.093	0	5918.76	13	0.2	0.01	13.171	65.9	4.12	20.6
33	39	4	1	1	1	6690.05	0.331	0.003	6690.39	10	0.001	0	10.066	50.3	2.405	12
34	34	2	2	0	1	6131.07	0.253	0	6131.32	9	0.711	0.034	13.819	69.1	3.641	18.2
35	34	1	2	1	0	6413.43	0.144	0.141	6413.71	14	0.198	0.013	5.281	26.4	4.328	21.6
36	49	5	2	0	0	6350.73	0.611	0	6351.34	5	0.132	0.004	4.216	21.1	2.639	13.2
37	40	0	1	1	1	6526.42	0.098	0	6526.52	10	0.001	0	10.5	52.5	2.655	13.3
38	41	1	1	0	0	6347.52	0.026	0.022	6347.57	0	0.001	0	2.296	11.5	0.291	1.5
39	29	3	2	1	0	6289.74	0.295	0.016	6290.05	10	0.189	0.009	7.187	35.9	4.806	24
40	27	2	2	0	0	6417.94	0.003	0	6417.94	0	0.059	0.004	3.316	16.6	1.012	5.1
41	31	2	2	0	1	6364.9	0.126	0.003	6365.03	4	0.054	0.003	7.007	35	0.716	3.6
42	55	4	1	0	0	6445.19	0.001	0	6445.19	0	0.001	0	3.019	15.1	0.224	1.1
43	46	0	2	0	0	6455.68	0.156	0	6455.83	0	0.001	0	2.484	12.4	0.536	2.7
44	45	0	1	0	1	6432.52	0.122	0.006	6432.64	0	0.001	0	3.256	16.3	0	0
45	29	0	1	0	1	6318.53	0.128	0.118	6318.77	0	0.001	0	3.061	15.3	0	0
46	33	1	1	0	0	6438.89	0.016	0.013	6438.92	0	0.001	0	0.942	4.7	0	0
47	24	1	3	1	1	6605.66	0.274	0.071	6606.01	12	0	0	11.396	57	3.947	19.7
48	49	2	1	1	0	6568.32	0.264	0	6568.59	10	0.001	0	8.341	41.7	2.854	14.3
49	48	0	0	1	1	6516.02	0.091	0.013	6516.13	10	0.001	0	3.285	16.4	3.139	15.7
50	38	4	1	1	0	6323.47	0.014	0	6323.49	11	0.001	0	6.519	32.6	3.606	18
51	37	4	2	1	1	6313.08	0.05	0	6313.13	10	0.001	0	5.988	29.9	2.686	13.4
52	39	3	2	0	1	6103.68	0.089	0	6103.77	5	0.311	0.013	10.728	53.6	2.515	12.6
53	40	0	0	1	0	6642.13	0.429	0.003	6642.56	10	0	0	7.12	35.6	2.874	14.4
54	29	3	0	0	1	6462.57	0.025	0	6462.59	0	0.001	0	0.582	2.9	0	0
55	37	2	3	1	1	6112.82	0.215	0.016	6113.05	11	0.002	0	9.989	49.9	4.944	24.7
56	41	3	4	0	0	5857.42	0.709	0	5858.13	20	0.456	0.023	6.875	34.4	6.801	34
57	39	1	1	1	1	6932.04	0.005	0.04	6932.09	0	0.001	0	7.092	35.5	2.053	10.3
58	35	1	2	0	0	6113.87	0	0	6113.87	2	0.144	0.007	3.965	19.8	1.531	7.7
59	42	2	2	1	0	6312.16	0.067	0	6312.22	15	0.124	0.006	4.558	22.8	2.834	14.2
60	42	2	2	0	1	6609.14	0.325	0	6609.47	0	0.001	0	10.293	51.5	0	0
61	38	2	2	0	1	6593.22	0.007	0	6593.22	7	0.319	0.014	9.645	48.2	1.761	8.8
62	29	4	1	1	0	6433.89	0.208	0	6434.1	0	0	0	6.339	31.7	3.44	17.2
63	38	0	1	1	0	6429.08	0.107	0.025	6429.21	10	0	0	5.574	27.9	3.446	17.2
64	39	0	1	1	0	6508.65	0.033	0	6508.68	10	0	0	5.527	27.6	2.24	11.2
65	34	4	0	0	1	6476.14	0.099	0	6476.24	0	0	0	1.711	8.6	0	0
66	34	0	2	0	0	6390.62	0.03	0	6390.65	0	0.001	0	2.668	13.3	0	0

Table B-24
Alternative 24 Results

67	36	0	1	0	0	6429.73	0.001	0	6429.73	0	0.001	0	0.823	4.1	0	0
68	48	0	2	1	0	6210.5	0.587	0	6211.09	17	0	0	8.299	41.5	3.092	15.5
69	39	3	3	0	0	6308.99	0.379	0	6309.37	4	0.001	0	4.536	22.7	1.403	7
70	43	3	2	1	1	6603.47	0.119	0	6603.59	10	0.001	0	8.473	42.4	3.358	16.8
71	46	1	1	0	0	6441.72	0.005	0.003	6441.73	0	0.037	0.002	1.865	9.3	0.127	0.6
72	38	0	2	1	1	6072.23	0.288	0	6072.52	14	0.348	0.017	11.166	55.8	5.742	28.7
73	34	1	1	1	0	6458.94	0.105	0	6459.04	0	0.001	0	2.675	13.4	1.929	9.6
74	36	7	2	1	1	6539	0.366	0.003	6539.37	10	0	0	11.498	57.5	3.897	19.5
75	38	3	1	1	1	6344.18	0.287	0	6344.47	1	0.326	0.015	6.312	31.6	3.633	18.2
76	40	2	3	0	1	6336.41	0.115	0	6336.52	5	0.676	0.028	10.191	51	2.608	13
77	48	2	3	1	1	6373.28	0.488	0	6373.76	23	0.005	0	7.16	35.8	4.667	23.3
78	41	1	2	1	0	6413.11	0.047	0.016	6413.17	2	0.001	0	1.878	9.4	1.056	5.3
79	30	2	5	0	1	5914.65	0.06	0.013	5914.73	12	0.564	0.03	6.601	33	4.649	23.2
80	34	5	0	1	1	6645.14	0.088	0.003	6645.24	10	0	0	7.22	36.1	3.577	17.9
81	47	1	2	1	0	6474.04	0.068	0.066	6474.17	10	0.001	0	5.871	29.4	4.57	22.9
82	39	1	3	0	1	5660.82	0.135	0.004	5660.96	12	0.029	0.001	14.084	70.4	3.228	16.1
83	33	3	3	0	1	6464.35	0.098	0	6464.45	1	0.225	0.009	10.901	54.5	1.674	8.4
84	37	3	1	0	0	6451.99	0.151	0.013	6452.15	0	0.001	0	1.925	9.6	0.656	3.3
85	30	1	3	1	1	6367.19	0.026	0	6367.22	0	0.004	0	6.85	34.2	0.491	2.5
86	38	2	2	1	1	6822.56	0.059	0	6822.61	0	0	0	0	0	3.911	19.6
87	33	1	1	0	1	6404.93	0.182	0.03	6405.14	0	0.001	0	4.041	20.2	0	0
88	42	4	4	1	1	6103.01	0.425	0.047	6103.49	7	0.329	0.013	7.468	37.3	4.373	21.9
89	48	1	0	1	0	6497.51	0.131	0.128	6497.76	10	0.001	0	2.09	10.4	2.09	10.4
90	41	4	1	1	1	6637.14	0.437	0	6637.58	1	0.134	0.006	8.743	43.7	2.491	12.5
91	40	2	3	0	0	6330.27	0.011	0.048	6330.32	6	0.008	0	3.865	19.3	1.279	6.4
92	42	0	0	1	0	6572.44	0.183	0.182	6572.81	10	0	0	4.09	20.5	4.09	20.5
93	40	2	3	1	0	6236.49	0.166	0	6236.65	14	0	0	9.194	46	4.844	24.2
94	29	4	4	1	1	6150.68	0.166	0.003	6150.85	19	0.255	0.012	13.739	68.7	5.68	28.4
95	40	2	3	1	1	6550.7	0.202	0.073	6550.98	2	0.001	0	5.579	27.9	0.672	3.4
96	32	5	3	1	0	6068.94	0.173	0	6069.11	16	0.352	0.018	10.7	53.5	4.853	24.3
97	34	0	2	1	1	6528.62	0.4	0	6529.02	16	0.002	0	5.591	28	7.141	35.7
98	43	0	2	0	0	6394.46	0.147	0.004	6394.61	0	0.001	0	3.31	16.6	0.177	0.9
99	35	1	3	0	0	6151.64	0.255	0.037	6151.93	8	0.076	0.004	5.115	25.6	2.536	12.7
100	47	3	3	0	1	6309.85	0.14	0.061	6310.05	10	0.07	0.002	6.162	30.8	1.611	8.1

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Vita

Captain Michael L. Fredley was born on 13 November 1964 in Hammond, Indiana. He graduated from Mason City High School in Mason City, Iowa, in 1982 and after a two-year Church mission in Paris, France, attended the University of Utah. He graduated Cum Laude from the University of Utah in June 1989 with a Bachelor of Science in Mathematics. Upon graduation, he received a regular commission in the USAF and served his first tour of duty at the 49th Test Squadron, Barksdale AFB, Louisiana. Upon joining the 49th, he became lead engineer for the testing and certification of conventional munitions from the B-52 bomber. Later he became lead engineer for B-1B conventional follow-on test and evaluation. He continued his testing duties until entering the School of Engineering, Air Force Institute of Technology, in August 1993.

Permanent Address: 916 West Hill Street
Champaign, Illinois 61821

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The objective of this research was to develop an analytical framework to assess future force structure requirements under the major uncertainties inherent in the post-Cold War era. Among the uncertainties are the frequency and nature of future threats to U.S. interests and the cost of maintaining, building, and demobilizing forces. The centerpiece of the methodology is a computer model which simulates the development of threats to U.S. interests and the actions the U.S. takes to protect those interests. From this simulation, the costs and risks associated with different policy alternatives can be estimated. The simulation is set within a broader decision-analysis framework which provides the philosophy for determining the inputs *to* the simulation and for analyzing the output *from* the simulation. The research included an analysis of 24 policy alternatives involving the size of the Base Force, the "safety margin" maintained between the force size and the force requirement, the rate of force buildup, and the rate of force demobilization. The results suggest that the buildup rate is a key factor in lowering the costs of the U.S. military while controlling the risk of being unable to protect U.S. interests.

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